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THE AMERICAN SPECIES OF DRIMYS

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*With three text-figures*

THE family Winteraceae is composed of six genera, of which only one, *Drimys* J. R. & G. Forst., is found in both hemispheres. The family is a very homogeneous one, the various genera having in common a distinct type of wood structure, leaf vascularization, staminal structure and vascularization, and pollen grain. Prof. I. W. Bailey and the writer (1, 10) have already expressed agreement with the prevalent opinion that the Winteraceae is entirely distinct from the Magnoliaceae, and a study of the family as a whole is in preparation. The scope of the present paper is merely a taxonomic revision of the American species, which belong entirely to the genus *Drimys*. A large part of my discussion is based upon the careful analyses made by Prof. Bailey, who has prepared material in substantial quantities for anatomical study. An attempt to correlate the anatomical characters with the gross morphology and the geographic distribution has been made. I am also indebted to Dr. I. M. Johnston for assistance during the preparation of the manuscript.

Often cited as an illustration of a genus with a bihemispheric-Antarctic distribution, *Drimys* also illustrates the varying degree of differentiation which may be found in two sections of a widespread genus. The representatives in the New and the Old Worlds have a great deal in common, and attempts to break up the complex into two genera — *Drimys* in America and *Tasmannia* in the Old World — are not generally accepted, nor does this division seem merited. However, it is obvious that two good sections, or perhaps subgenera, are recognizable. The American representatives of *Drimys* are hermaphrodite trees or shrubs, with always perfect flowers, and the stigmatic surface of the carpels is limited to the apical or subapical region, the small stigma being usually short-stipitate. The Old World species, on the other hand, are dioecious or polygamo-dioecious (the staminate flowers usually bearing sterile carpels, the pistillate flowers being either with or without functional stamens), and the stigmatic surface is extended along the entire ventral suture of the carpel.

The fact that the above-mentioned characters are so firmly fixed in the western and eastern hemispheres respectively seems to indicate that the original division of the genus into these two populations was ancient. In its Old World area (Australia, New Guinea, Borneo, the Philippines, and perhaps a few adjacent islands), *Drimys* shows great polymorphy and about 36 well marked species are recognizable. This variation extends to great diversity in foliage and floral characters. In America, on the other hand, no such extensive variability is evident, and a smaller degree of specific stability has been evolved. It is obvious that the genetic composition of the genus is much more diverse in the Old World than in the New. To this extent, *Drimys* is an excellent illustration of the degree to which the potential polymorphy of a group may vary in different parts of its area.

Many students have taken *Drimys* to include some very diverse elements in the Old World, but, as already expressed (10), I find it advisable to follow van Tieghem (11) and Hutchinson (7) in segregating the genera *Bubbia*, *Belliolum*, *Exospermum*, *Zygogynum*, and the New Zealand species (referred by van Tieghem to "*Wintera* Forst."). With these elements removed, *Drimys* is sharply distinguished from other members of the Winteraceae by having a calyx which completely encloses the bud, composed of two (or rarely three) sepals which are papyraceous to membranaceous in texture. Occasionally these sepals are calyptrate and soon deciduous, but in most American specimens they are more or less persistent, often remaining attached to one another at their basal margins while losing their connection with the torus; on mature plants the sepals are thus often found as a coherent unit encircling the pedicel but free from it. Many of the Old World species customarily lose the sepals entirely before anthesis. The remaining genera of Winteraceae have a more ordinary calyx, composed of two to several more or less deltoid or irregular lobes which persist through anthesis and which do not enclose the bud, or at least not after the very earliest stages of ontogeny. The stamens of *Drimys* are composed of a carnose essentially terete filament, to the apex of which the two subvertical locules are laterally adnate, quite free from one another and dehiscing laterally or subextrorsely. In other members of the Winteraceae the stamens show various and often conspicuous modifications. The combination of calyx- and stamen-characters here discussed serves to set *Drimys* apart from the rest of the family in such a sharp manner that there can be no serious question of merging other genera with it.

*Drimys* was founded by J. R. and G. Forster upon two species, *D. Winteri* from the Straits of Magellan and *D. axillaris* from New Zealand. Since these two species are not congeneric, the genotype of *Drimys* must be designated. Van Tieghem (11), who first broke up the older generic concept, took *D. Winteri* to be the genotype, referring *D. axillaris* to "*Wintera* Forst." (not *Wintera* Murr.). In this latter decision he is thwarted by the International Rules, since *Wintera* Murr. was proposed specifically to replace *Drimys* J. R. & G. Forst., and "*Wintera* Forst." is merely an incorrect use of Murray's generic name. The typification of *Drimys* has been discussed by Dandy (in Jour. Bot. 71: 119-122. 1933), who has

proposed the generic name *Pseudowintera* for *D. axillaris* and its allies in New Zealand.

There has been a vast difference of opinion among taxonomists as to the nomenclatural subdivision of the American population of *Drimys*, which ranges from Cape Horn to southern Mexico, with representatives in Juan Fernandez and in eastern Brazil, adjacent Paraguay and Argentine, and on Mt. Roraima. No specimens have yet been reported from Bolivia or Ecuador, but the discovery of the genus in these countries seems possible, in view of the fact that a specimen from the Andes of northern Peru has recently been collected. I have seen no specimens from Honduras, El Salvador, or Nicaragua, but this may be due to our poor material from these regions. In general, the genus may be said to occur in mountains throughout the western hemisphere south of Mexico; toward the south it occurs at or near sea-level. In certain regions it is very common; such areas are the Magellanic region, central Chile, Minas Geraes, Colombia, and Costa Rica. Elsewhere in its range the genus occurs sporadically, but future collections will show whether the above-mentioned centers are actual or whether they merely represent the best-known parts of the generic range.

Among the early students who considered the genus, some, such as De Candolle (2, 3), were inclined to recognize several species with distinct geographic areas; the number of specimens available to such workers was very limited and naturally they had an incomplete idea of the amount of variability within any given portion of the population. Then followed a period in which it was customary to refer all American members of the genus to *D. Winteri*, as varieties, forms, or merely unstable variants. This trend, given weight by Hooker (6), persisted until Miers (8, 9) considered the genus as a whole. With his customary narrow specific delimitation, Miers arranged the population into nine distinct species, separating them into four groups on the basis of the position and branching of the inflorescence (one division including the New Zealand *D. axillaris*, which must be removed from the genus). An examination of the material now available shows definitely that no satisfactory specific lines can be based upon the position of the inflorescence. Miers utilized the terminal versus the axillary position of the inflorescence, but it appears that the inflorescence is always terminal at its inception, the umbels (or single flowers) being borne about the growing point of the branchlets. As the plant develops, this growing point protrudes through the cluster of inflorescences, leaving them lateral and often pseudoaxillary. Sometimes the inflorescences thus appear in two or more whorls toward the apices of branchlets, and whether they are terminal or lateral appears to depend merely upon the stage of development. It seems likely that in certain parts of the population (e.g. the Magellanic area, etc.) growth is sharply seasonal, and in these parts the inflorescences are most likely to appear terminal. In other areas (e.g. Colombia, etc.) growth is more or less continuous, and the inflorescences develop with a more loose arrangement rather than all at one time at the apex of the branchlets. Therefore, the apical or lateral position of the

flowers can be given little weight in a taxonomic consideration. Whether the flowers are single or aggregated into umbels or fascicles is also susceptible to variation in the same individual and therefore cannot be too rigidly interpreted, although to be sure there are definite trends in this respect in different geographic areas. Thus, practically all the Magellanic specimens have the flowers single, while those in the higher Andes of Chile and Argentine have a strong tendency in this direction. In the rest of the population the flowers are predominantly umbellate, but the single-flowered character is shown here and there throughout.

Miers' treatment has not been accepted by other workers. Eichler (4), taking up the whole American population for his treatment in *Flora Brasiliensis*, referred it all to *D. Winteri*, recognizing five forms. The most recent regional treatment of importance is that of Hauman (5), who, discussing the Argentine plants, recognized two species, *D. Winteri* and *D. brasiliensis*, the former with two varieties and one form, the latter with two varieties. The various treatments of other workers need not be examined in detail; the current tendency in herbaria is to follow the line of least resistance and refer all the material to *D. Winteri*. From a casual examination of the material in any single herbarium, one would indeed have difficulty in following any other course, as the population appears remarkably homogeneous. And yet, any two specimens are likely to be quite different in such details as number and size of floral parts, but to the casual observer these differences do not seem concomitant with geographic distribution and thus they are commonly disregarded. Differentiation in the various geographic areas, to be sure, is incomplete, and one searches in vain for definite and rigid characters upon which a classification can be based. In the following paragraphs I shall consider the various parts of the plant in turn, pointing out the degree of variability, if any, which occurs in different parts of the population.

**HABIT.** The American representatives of *Drimys* are shrubs or low trees, most often occurring in cool moist temperate forest. Individuals growing in very exposed situations apparently trend to be gnarled and often to have the leaves closely crowded toward the apices of branchlets. Other individuals are more symmetrical and have the leaves scattered along the branchlets. This character is very likely a reflection of environment and is not dependable. In general, the more southern members, as the Magellanic population, have a more compact habit, with stouter branchlets and petioles; the Colombian specimens, which are comparatively large, also have uniformly thick branchlets. The branchlets throughout are brownish to cinereous, sometimes glaucous when young, subterete or essentially so, and usually longitudinally striate or rugulose.

**FOLIAGE.** The leaves are alternate and often irregularly crowded, sometimes appearing essentially whorled about the growing points of the branchlets. The length and thickness of the petiole varies substantially in any geographic area or even on an individual. In general, the most southern part of the population has the strongest petioles, but the proportion of

length to diameter of this organ is too variable to receive systematic attention.

The leaf-blades are coriaceous in varying degrees, variously shaped but most often oblong or elliptic to obovate, with a stout costa and immersed or faintly prominulous secondary nerves. The degree to which the secondaries are immersed bears a vague correlation to geographic distribution, but this character is quite undependable and cannot be considered anything more than a trend, subject to local fluctuation. The direction of the secondaries has a certain stability in each region. In color, the leaf-blades vary on the upper surface from pale green to dark brown, usually being glaucous beneath when young.

The lower surface of the leaf-blades has a slightly different aspect in the different parts of the population, and an analysis of this character is found to be of use. Although it is an obscure character and furthermore is not rigid and entirely dependable, nevertheless it may serve as a subsidiary criterion. In using this character, the lower surface of the leaf-blades should be examined under a magnification of about 50 diameters. The stomata are always depressed, and the depression is filled with wax-like and very finely granular material. It is due to these stomatic areas that the lower leaf-surfaces, not only in *Drimys* but throughout the family, appear to be "punctate" with white or pale dots when dry. In *Drimys* Sect. *Wintera*, the stomatic areas appear to vary in size from about 0.02 to 0.05 mm. in diameter.

The lower leaf-surface between the stomata may be essentially free of wax-like granular material, or this material may cover the entire surface in a more or less uniform layer. In the latter case the entire surface appears to be whitish or glaucous. It should be noted that the glaucous appearance is frequently lost in herbarium specimens, due to variations in methods of drying. In general, the stomatic areas are more conspicuous in the southern populations (*D. Winteri* and *D. confertifolia*), while in *D. granadensis* and *D. brasiliensis* they are often obscure.

In most specimens of *D. brasiliensis* the lower epidermis is papillate, the papillae being club-shaped or knob-like protuberances arising from epidermal cells and distributed between the stomatic areas. The papillae may be covered with wax-like granules, like the plane surfaces mentioned above.

The above-described characters of the lower leaf-surface are not sufficiently well fixed in each part of the population to be considered more than trends, although the extreme forms are readily recognized. I am indebted to Prof. Bailey for the above analysis.

INFLORESCENCES. I have already remarked on the inconstant nature of the position and type of the inflorescence — whether terminal or lateral, umbellate or single-flowered. These differences may be taxonomically used only with great caution and at best they demonstrate somewhat inconsequential trends rather than fixed characters. The proportionate length of the peduncle and pedicels varies greatly on the same individual. The inflorescences are usually subtended by imbricate papyraceous bracts, which

are generally oblong and obtuse, sometimes up to 15 mm. long and 7 mm. broad. When the inflorescences are umbellate, the pedicels are subtended by a whorl of bracteoles similar to the bracts but smaller, not exceeding 10 by 4 mm. Both bracts and bracteoles are very early caducous and are seldom seen on herbarium material; they appear to offer no points of difference in the various populations, although they may be a little more persistent toward the south.

**SEPALs.** The sepals are usually two, rarely three, and vary in texture from membranaceous to papyraceous; they may be essentially opaque and apparently eglandular or with conspicuous glands. In shape they are usually suborbicular-deltoid, the variations in size being fairly constant in different geographic areas. In general, the specimens from the northern part of the range have thicker and larger sepals than those from the south, but there are many individual exceptions to this generality.

**PETALS.** The petals are uniformly white and are extremely variable in number, ranging from 4 to 17 and occasionally being as many as 22 or 25 (in forms from Peru and Panama). They are whorled on the torus and from 1- to 3-seriate. Although the number of petals is inconstant within any given geographic population, there are certain broad tendencies which may be noted. For instance, specimens from Chile, Patagonia, and Juan Fernandez have the petals 4-14 in number, while in other parts of the range, according to my observations, the petals are 8-17, and rarely as many as 25. The matter of petal-size is too variable in each geographic region to make any generalization possible, although it may be noted that the largest petals have been found in the Colombian population. In texture, it may be observed that the southernmost specimens have the petals usually pellucid-glandular or apparently eglandular, while specimens from the north and from Brazil have the glands usually opaque and more obvious.

**STAMENS.** The torus is uniformly subglobose or short-cylindric, the stamens occurring in several (2-4 or rarely 5) whorls, being 15-50 (rarely to 65) in number. There appears to be an incipient tendency toward more numerous stamens in the northern part of the range. The southern specimens have 15-40 stamens, the northern and Brazilian specimens 18-50 (sometimes as many as 65). The filaments are carnose and essentially terete, more or less glandular with immersed and inconspicuous glands. The distal portion of the filament, to which the anther-locules are attached and to which I shall refer as the connective, offers a more or less dependable character in its glandular marking. Specimens from Chile, Patagonia, and Juan Fernandez have the connective eglandular or with very inconspicuous and essentially colorless glands, which are scarcely apparent, even under considerable magnification. The northern and Brazilian specimens, on the other hand, have the connective with numerous immersed glands and toward the apex usually bear a few conspicuous yellowish superficial glands. These are often very obvious under small magnification and only rarely lacking. A specimen from Mt. Roraima has the connective produced into a small apiculum, but otherwise this organ is essentially truncate. The

anther-locules are elliptic to oblong, variable in size within rather narrow limits which appear to have only inconsequential geographic significance. The stamens are often noted as yellow by collectors.

**CARPELS.** The carpels are usually arranged in a single whorl around the blunt apex of the torus, being from 3 to 12 in number (rarely 2-24). The only geographic significance which can be attached to the number of carpels is found in the more common occurrence of high numbers toward the north (up to 24 in a single Panama specimen). However, the great variation in number of carpels which is found in any geographic area indicates that this character is nearly useless for taxonomic purposes. The shape of the carpels is essentially uniform throughout, and their size is similarly quite uniform. The stigma is either lateral toward the ventral apex or subterminal. Sometimes it is sessile, sometimes short-stipitate, sometimes obviously exceeding the body of the carpel and sometimes exceeded by that blunt surface. In general, the southern specimens have the stigma lateral or at least exceeded by the body of the carpel, while the northern and Brazilian specimens have the stigma obviously stipitate, subterminal, and exceeding the body of the carpel. Carpellary characters are not firmly fixed in geographic regions, and the above-mentioned trends are at best only incipient points of differentiation. The ovules are biseriate on the two ventral placentas, varying from 6 to 26 in number. As regards the number of ovules, a distinct geographic differentiation is discernible. The Juan Fernandez specimens have uniformly (16-)18-26 ovules, while in the remainder of the population the ovules are less than 16 (except for one or two Chilean plants which have 18 ovules). In Chile and Patagonia the ovules are 9-16(-18); in the northern mountains and in Brazil the ovules are 6-12.

Fruits are very uniform throughout the range of the genus in America and offer no stable characters for specific identification. Usually only a few carpels per flower develop, but sometimes all reach maturity. The carpels become obovoid or ellipsoid and often slightly falcate berries, 6-15 mm. long and 4-8 mm. broad at maturity. They are dark purple or reddish black, at length becoming deep black, and as a rule they are short-stipitate to obtuse at base and rounded to obtuse at apex. The pericarp becomes soft and subcarnose at maturity and is often conspicuously yellow-glandular. The seeds are usually fewer than the ovules (often reduced to 2 or 3 in number) and are imbedded in a thin evanescent pulp; they are black or castaneous, polished, inequilaterally obovoid and usually strongly falcate, 3-5 mm. long, 1.5-2 mm. broad, acute or subacute at base, rounded at apex, and with a thin and brittle testa. Miers (9: 127) has described in detail the structure of the seed, although his terminology may not be accepted by morphologists. The characters discussed in the above paragraph are so uniform throughout the American species that they are not repeated in the specific descriptions given below.

**CONCLUSIONS.** From the above notes it is perceived that there are no clear-cut characters in the American population which can be associated

with geographic areas. It seems likely that the various geographic populations of *Drimys* in America have slightly different genetic compositions, as indicated by the diverse trends which I have pointed out above. None of these trends has been carried far enough to be recognized as an absolute character, but nevertheless they can be used in classification, provided that they are recognized as merely trends or tendencies and are not taken as definite rigid characters. Single specimens, taken at random from the range of the genus in America, often defy classification, but when numerous specimens from each area are examined one perceives the direction of morphological trends. It might almost be assumed that, given enough time and continuation of the present-day geographic isolation, the various geographic populations of *Drimys* will become narrower in their respective tendencies until even casually selected individuals will be rigidly characterized.

The question which faces the taxonomist is whether species or even subspecific units should be established on characters which, instead of being firmly established, are merely indicated by broad general trends. The conclusion at which I have arrived is somewhat intermediate between the despairing attitude of Hooker and most recent herbarium workers and the optimistic viewpoint of Miers that several good species are discernible. I am able to recognize four major groups which, in my opinion, are sufficiently stable and recognizable to be designated as species. These groups are (1) the Juan Fernandez population, (2) the population from Chile and southern Argentina, (3) the population from Peru to western Venezuela and Mexico, and (4) the Brazilian, Paraguayan, and northern Argentinian population, this latter including specimens from Mt. Roraima. From the lack of definite morphological barriers it may be assumed that these populations would be interfertile, but the fact remains that they are not interfertile in nature simply because of their present-day geographic isolation from one another. The morphological trends in each population, although often trivial and obscure, are nevertheless quite apparent.

Within each of the above-mentioned populations (except the small and compact group from Juan Fernandez) I have been able to recognize several minor groups which I designate as varieties. The morphological tendencies within each of these varieties are not emphatic, but each variety is geographically restricted and shows a certain amount of incipient differentiation.

In citations of literature, I have taken the liberty of correcting the spelling of the generic name, when necessary, to *Drimys* (the original spelling) from *Drymis* or *Drymys*. I have examined most of the illustrations portraying the American representatives of the genus and have referred these to the proper subdivision as treated in the present paper. A few plates are not available to me, while many others are so inadequate that they do not permit positive identification; these latter are not cited. The great bulk of the illustrations has been referred to *Drimys Winteri*, but it is obvious that many do not portray the Magellanic variety upon which this name is based.



Citations of specimens are reasonably complete for the larger American herbaria, but of course additional collections of most entities will be found in European institutions. I am greatly indebted to the directors and curators of the following institutions for the loan of material: Arnold Arboretum (A); Field Museum of Natural History (F); Gray Herbarium (GH); Missouri Botanical Garden (M); New York Botanical Garden (NY); University of California (UC); U. S. National Herbarium (US). The parenthetical letters indicate the place of deposit of the cited specimens.

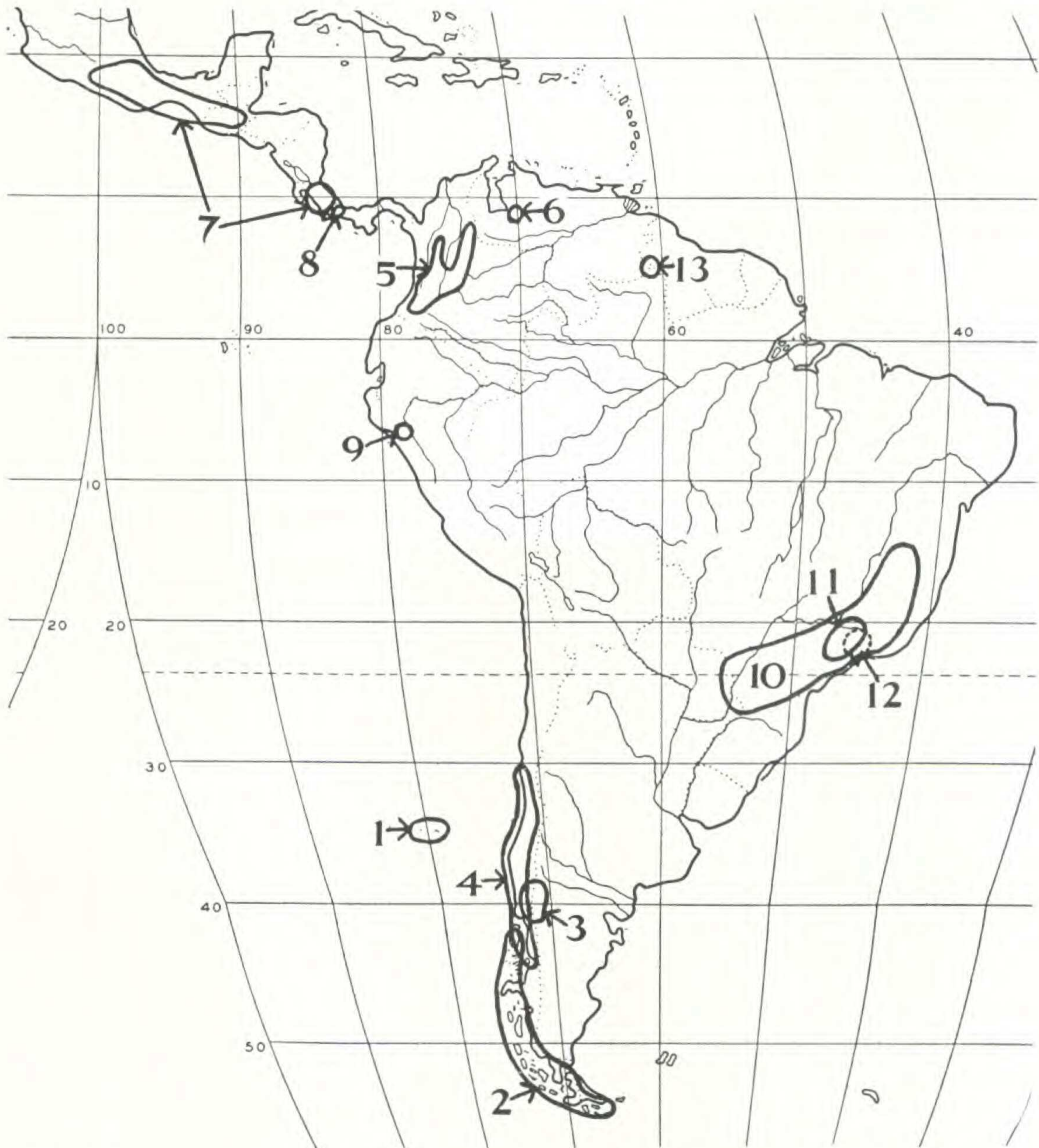


FIG. 1. Approximate known distribution of *Drimys* in America; 1. *D. confertifolia*; 2. *D. Winteri* var. *punctata*; 3. *D. Winteri* var. *andina*; 4. *D. Winteri* var. *chilensis*; 5. *D. granadensis* var. *grandiflora*; 6. *D. granadensis* var. *uniflora*; 7. *D. granadensis* var. *mexicana*; 8. *D. granadensis* var. *chiriquiensis*; 9. *D. granadensis* var. *peruviana*; 10. *D. brasiliensis* var. *campestris*; 11. *D. brasiliensis* var. *retorta*; 12. *D. brasiliensis* var. *angustifolia*; 13. *D. brasiliensis* var. *roraimensis*. From Goode's series of base maps, no. 201HCW.

## TAXONOMIC TREATMENT

**Drimys** J. R. & G. Forst. Char. Gen. 83. 1776; Forst. f. in Nova Acta Reg. Soc. Sci. Ups. **3**: 181. 1780; Lam. Encycl. **2**: 330. 1786; Juss. Gen. Pl. 280. 1789; DC. Reg. Veg. Syst. Nat. **1**: 442. 1817, Prodr. **1**: 78. 1824; St. Hil. Fl. Bras. Merid. **1**: 24. 1825; Lindl. Nat. Syst. Bot. ed. 2. 17. 1836; Meisn. Pl. Vasc. Gen. 3 (pars alt. 5) 1836; Spach, Hist. Nat. Veg. **7**: 436. 1839; Endl. Gen. Pl. 839. 1839, Enchir. Bot. 428. 1841; Gay, Fl. Chil. **1**: 60. 1845; Lindl. Veg. Kingd. ed. 2. 419. 1847; Miers in Ann. Mag. Nat. Hist. III. **2**: 37. 1858, Contrib. Bot. **1**: 126. 1861; Benth. & Hook. f. Gen. Pl. **1**: 17. 1862; Eichl. in Mart. Fl. Bras. **13**(1): 133. 1864; Baill. Hist. Pl. **1**: 156, 190. 1867-69; Prantl in E. & P. Nat. Pfl. III. **2**: 19. 1891; Parment. in Bull. Sci. Fr. & Belg. **27**: 222 seq., pro parte. 1896; v. Tiegh. in Jour. de Bot. **14**: 280-290. 1900; Pilger in E. & P. Nat. Pfl. Nachtr. **2**: 108. 1906; Hutchinson in Kew Bull. **1921**: 190. 1921; Hauman in Comun. Mus. Nac. Buenos Aires **2**: 45. 1923.

*Wintera* Murr. Syst. Veg. ed. 14. 507. 1784; Pers. Syn. Pl. **2**: 84. 1806; Humb. & Bonpl. Pl. Aequin. **1**: 205. 1808; Lindl. Introd. Nat. Syst. Bot. 26. 1830.

In the above citations I have listed the most important references to the genus as a whole, omitting those in which only the Old World species are considered. The genus is readily divided into two sections as follows:

Plants hermaphrodite, the flowers always perfect; carpels with the stigmatic surface limited to the apical or subapical region, the stigma small, subpeltate, often short-stipitate; flowers solitary or fasciculate or arranged in umbels; American species. . . . .Section *Wintera*.

Plants dioecious or polygamo-dioecious, the staminate flowers usually bearing sterile carpels, the pistillate flowers either with or without functional stamens; carpels with the stigmatic surface extended along the ventral suture, the stigma not stipitate; flowers solitary or fasciculate, never in umbels; Old World species. . . . .Section *Tasmannia*.

The present treatment is concerned in detail only with the Section *Wintera*. A sectional name for the Old World representatives was apparently first proposed by F. v. Mueller (Pl. Indig. Col. Vict. **1**: 20. 1860) as *Drimys* Sect. *Tasmannia*, based on *Tasmannia* R. Br. ex DC. Reg. Veg. Syst. Nat. **1**: 445. 1817. The more detailed synonymy of the Section *Wintera* follows:

**Drimys** Sect. **Wintera** (Murr.) DC. Reg. Veg. Syst. Nat. **1**: 443. 1817, Prodr. **1**: 78. 1824.

*Magellania* Commers. ex Lam. Encycl. **2**: 330, as synonym. 1786.

*Magallana* Commers. ex DC. Reg. Veg. Syst. Nat. **1**: 443, as synonym. 1817; Endl. Enchir. Bot. 428, as synonym. 1841; non Cav.

*Winterana* Sol. ex Endl. Enchir. Bot. 428, as synonym. 1841; non L.

*Canella* Domb. ex Endl. Enchir. Bot. 428, as synonym. 1841; non P. Br.

*Boique* Molin. ex Endl. Enchir. Bot. 428, as synonym. 1841.

*Drimys* Sect. *Eudrimys* v. Tiegh. in Jour. de Bot. **14**: 288. 1900; Pilger in E. & P. Nat. Pfl. Nachtr. **2**: 108. 1906; non DC.

*Drimys* Sect. *Polyacra* v. Tiegh. in Jour. de Bot. **14**: 289. 1900; Pilger in E. & P. Nat. Pfl. Nachtr. **2**: 108. 1906.

*Drimys* Sect. *Monopleura* v. Tiegh. in Jour. de Bot. **14**: 289. 1900; Pilger in E. & P. Nat. Pfl. Nachtr. **2**: 108. 1906.

*Drimys* Sect. *Polypleura* v. Tiegh. in Jour. de Bot. **14**: 289. 1900; Pilger in E. & P. Nat. Pfl. Nachtr. **2**: 108. 1906.

The first attempt to divide the genus *Drimys* into groups was made in 1817 by De Candolle, who erected the Section *Drimys* on *D. axillaris* and the Section *Wintera* on *D. Winteri* and three other American species. In

1824 De Candolle maintained the same classification, except that he used the sectional name *Eudrimys* for *D. axillaris*. The fact that De Candolle selected the New Zealand species of the Forsters as the basis of his Section *Drimys* (or *Eudrimys*) does not affect the typification of the genus.

No further serious attempt to break up the genus into sections was made until 1900, when van Tieghem proposed four sections, which seem to be based on neither essential morphological characters nor geography. His Section *Eudrimys* is based upon *D. Winteri*, *D. angustifolia*, and six Old World species, but, since it excludes *D. axillaris*, it is not the same entity as De Candolle's Section *Eudrimys*.

Van Tieghem was the first student to realize that *D. Winteri* and *D. axillaris* are not congeneric, and he definitely retained the generic name for the first of these entities. *Drimys axillaris* and two other New Zealand species were referred by Dandy to his newly proposed *Pseudowintera* in 1933.

#### KEY TO THE AMERICAN SPECIES

Sepals membranaceous or submembranaceous; petals 4-14, eglandular or sparsely pellucid-glandular; stamens 15-40, the connectives eglandular or rarely with a few very inconspicuous colorless apical glands; stigma usually lateral near apex of carpel, subsessile or short-stipitate, exceeded or equalled by the body of the carpel; ovules 9-26; lower leaf-surface appearing white- or gray-punctate, due to the usually distinct and conspicuous stomatic areas.

Ovules (16-)18-26 on elongate placentas; inflorescence always umbellate; leaf-blades narrowly oblong or elliptic or obovate-lanceolate, usually 5-12 by 1.3-3.5 cm.; Juan Fernandez.....1. *D. confertifolia*.

Ovules 9-18 on short or slightly elongate placentas; inflorescence umbellate or fasciculate or the flowers single; leaf-blades various; Chile and adjacent southern Argentine.....2. *D. Winteri*.

Sepals often papyraceous, sometimes membranaceous; petals 8-17(-25), usually yellow-glandular with opaque glands; stamens 18-50(-65), with glandular connectives, these usually with a few obvious apical yellow glands; stigma usually subterminal, sometimes lateral near apex of carpel, short-stipitate (except in *D. brasiliensis* var. *roraimensis*) and usually exceeding the body of the carpel; ovules 6-12; lower leaf-surface usually not obviously punctate, the stomatic areas not conspicuously paler than the rest of the leaf-surface.

Leaf-blades elliptic-oblong or narrowly so, 5-16(-17.5) by 1-5.5 cm., usually obtuse at apex, the secondary nerves 8-19 per side, prominulous to immersed on both surfaces; lower leaf-surface not papillate; peduncle 7-65(-90) mm. long; sepals 4.5-10(-12) by 5-11(-13) mm.; southern Mexico to western Venezuela and Peru.....3. *D. granadensis*.

Leaf-blades variously shaped, often elliptic-obovate, sometimes nearly lanceolate, rarely exceeding 11 by 4 cm., rounded or broadly obtuse or emarginate at apex, the secondary nerves 6-10(-14) per side, often obscure; lower leaf-surface often papillate; peduncle less than 40 mm. long; sepals 4-7 by 4-8 mm.; southeastern Brazil, adjacent Paraguay and Argentine, and Mt. Roraima region.....4. *D. brasiliensis*.

1. ***Drimys confertifolia*** Phil. in Anal. Univ. Chile [13]: 163. May 1856, in Bot. Zeit. 14: 641. Sept. 1856, in Ann. Sci. Nat. IV. 7: 100. 1857.  
*Drimys fernandeziana* Steud. in Flora 39: 408. July 1856.  
*Drimys Fernandezianus* Miers in Ann. Mag. Nat. Hist. III. 2: 48. 1858, Contrib. Bot. 1: 137. pl. 27B. 1861; Pilger in E. & P. Nat. Pfl. Nachtr. 2: 108, as *D. fernandeziana*. 1906.

*Drimys Winteri* var. *fernandeziana* Steud. ex Reiche, Fl. Chil. **1**: 27. 1896.

*Drimys Winteri* var. *confertifolia* Johow, Estud. Fl. Juan Fernandez 113, 245. 1896;  
Skotts. Nat. Hist. Juan Fern. and Easter Isl. **2**: (Phanerog. Juan Fern. Isl.) 127.  
1921.

Tree, often large, up to 15 m. high, the trunk probably often 50 cm. in diameter, the branchlets brownish, rugulose, subterete, 2–4 mm. in diameter toward apices; leaves crowded toward apices of branchlets; petioles rugulose, shallowly canaliculate, 3–14 mm. long, 1–2 mm. in diameter, often narrowly winged, slightly swollen at base; leaf-blades coriaceous, dark brown or olivaceous above when dried, slightly paler to glaucous beneath and appearing distinctly punctate, narrowly oblong or elliptic or obovate-lanceolate, (3–)5–12 cm. long, (0.8–)1.3–3.5 cm. broad, attenuate at base and decurrent on the petiole, obtuse or rounded at apex, slightly recurved at margin, conspicuously so toward base, the costa shallowly canaliculate above, prominent beneath, the secondary nerves 6–10 per side, ascending at an angle of 40–55°, prominulous or rarely immersed on both surfaces, usually anastomosing toward margin, the veinlets immersed or inconspicuously prominulous beneath; inflorescences clustered at apices of branchlets, umbellate, the peduncle 7–40 mm. long, the flowers 3–6 per inflorescence, the pedicels 6–45 mm. long; sepals membranaceous, pellucid-glandular, sub-orbicular-ovate, 6–8 mm. long and broad, inconspicuously apiculate at apex; petals 7 or 8 (rarely to 12), membranaceous, sparsely and obscurely pellucid-glandular, oblong, 8–14 mm. long, 2.5–5 mm. broad, obtuse at apex; stamens 30–40, 3- or 4-seriate, the filaments eglandular, 1.5–3 mm. long, the connective eglandular or essentially so, the locules 0.8–1.2 mm. long; carpels 3–6, obovoid, about 3 mm. long at anthesis, the stigma lateral near apex, short-stipitate, not exceeding the body of the carpel, the ovules 18–26 (rarely 16) on elongate placentas. (FIG. 2, a–f.)

DISTRIBUTION: Juan Fernandez; the plant is said by Skottsberg to be one of the commonest forest trees on Masatierra, ranging from 200 m. upward to the highest ridges, while on Masafuera it is not seen much lower than 500 m. and occurs up to about 1200 m. In addition to the collections cited below, the species is represented by material obtained by Philippi (the type collection), Germain, and Johow; Miers cites *Cuming 1328*, and Skottsberg lists several of his numbers which are not available to me.

JUAN FERNANDEZ: Masatierra: *Bertero 1453* (type coll. of *D. fernandeziana* Steud.; also cotype coll. of *D. Fernandezianus* Miers, M, NY), *Moseley* (F, GH), *Reed* (GH); Cumberland Bay, *Hastings 255* (NY, UC, US); Salsipuedes, *Skottsberg 88* (US), *88b* (NY); Portezuelo, *Skottsberg 6* (NY); slopes of Yunque, *Bock 49* (F, GH, M, NY, US); Masafuera: *Chapin 1074* (NY).

NATIVE NAME: *Canelo*.

This species was independently proposed by Philippi, Steudel, and Miers within a period of two years; furthermore, Steudel and Miers used the same specific epithet and based their concepts upon the same collection.

*Drimys confertifolia* is a biological entity with considerable stability of number and form of parts. Of all the groups in *Drimys* in America, this most obviously merits specific rank and can be submerged in a continental species only if all the American representatives are combined. Its closest relative is *D. Winteri* (and especially var. *chilensis*), with which it has in common eglandular stamens, a lateral stigma not exceeding the body of the carpel, obscurely glandular petals, and a lower leaf-surface with conspicuous stomatic areas. *Drimys confertifolia* is further characterized by its

crowded narrow leaves, always umbellate flowers, an essentially fixed number of petals (usually 7 or 8), few carpels, and numerous ovules. The last is the most definite character and, in spite of its trivial nature, seems dependable enough to be the principal basis of the species.

2. *Drimys Winteri* J. R. & G. Forst. Char. Gen. 84. 1776.

Shrub or small tree, the branchlets brownish or dark cinereous, rugulose or sometimes smooth, subterete, 3–6 mm. in diameter toward apices; petioles rugulose, canaliculate, 3–27 mm. long, 1–4 mm. in diameter, slightly swollen toward base; leaf-blades coriaceous or thick-coriaceous,

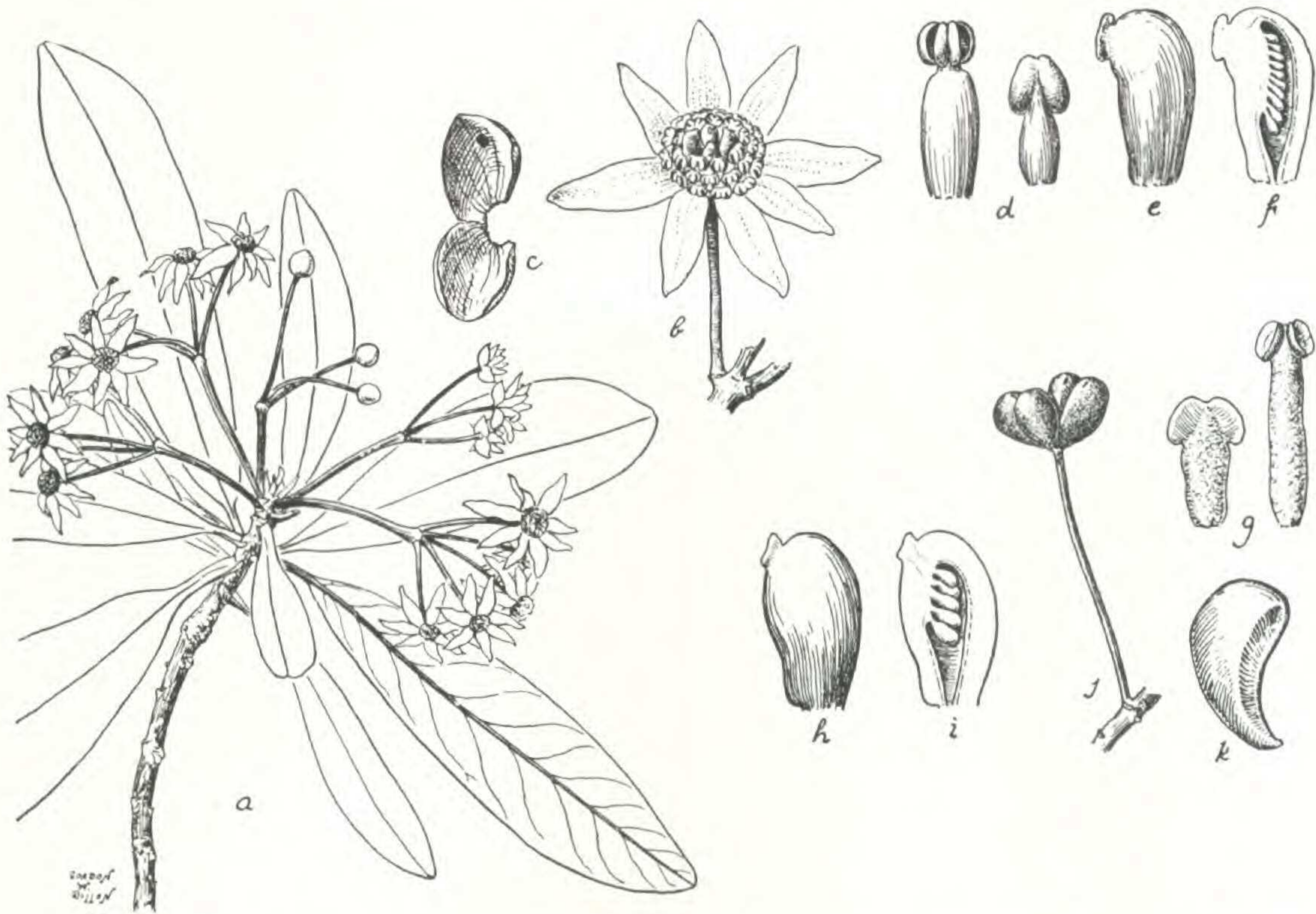


FIG. 2. *a-f.* *Drimys confertifolia*, drawn from Bock 49: *a.* flowering branchlet,  $\times \frac{1}{2}$ ; *b.* flower,  $\times 1\frac{1}{2}$ ; *c.* detached calyx,  $\times 1\frac{1}{2}$ ; *d.* stamens, extrorse and introrse views,  $\times 5$ ; *e.* carpel,  $\times 5$ ; *f.* carpel, longitudinal section,  $\times 5$ . *g-k.* *Drimys Winteri* var. *andina*, drawn from Werdermann 1245: *g.* stamens, introrse and extrorse views,  $\times 5$ ; *h.* carpel,  $\times 5$ ; *i.* carpel, longitudinal section,  $\times 5$ ; *j.* fruit, showing four mature carpels,  $\times \frac{1}{2}$ ; *k.* seed,  $\times 3$ .

pale green to dark brown above when dried, glaucous or at least paler beneath and usually appearing distinctly punctate, usually obovate-oblong to elliptic, (4–)6–15(–18) cm. long, (1.3–)1.8–6.5(–7) cm. broad, attenuate to obtuse at base and decurrent on the petiole, obtuse or rounded and sometimes faintly emarginate at apex, slightly recurved at margin, the costa nearly plane or shallowly canaliculate above, prominent beneath, the secondary nerves 5–15 per side, ascending or erecto-patent, prominulous or immersed, obscurely anastomosing toward margin; inflorescences usually clustered at or near apices of branchlets, umbellate or the flowers single or fasciculate, the peduncles (if present) up to 50 mm. long, the pedicels 10–70 mm. long; sepals membranaceous or submembranaceous, usually obscurely pellucid-glandular, sometimes copiously so, broadly ovate to sub-

orbicular or reniform, 4–7 mm. long, 4–12 mm. broad, apiculate to rounded at apex; petals 4–14, membranaceous, sparsely pellucid-glandular, oblong to narrowly obovate, 6–20 mm. long, 2–6(–7) mm. broad, obtuse at apex; stamens 15–40, 2–4-seriate, the filaments carnose, eglandular or nearly so, 0.8–3 mm. long, the connective eglandular or rarely with a few very inconspicuous colorless apical glands, the locules 0.5–1 mm. long; carpels (2–)3–10, obovoid or ellipsoid, 2–3.5 mm. long at anthesis, the stigma lateral near apex or rarely subterminal, peltate, sessile or short-stipitate, exceeded or equalled by the body of the carpel, the ovules 9–18 on short or slightly elongate placentas.

DISTRIBUTION: Central Chile (Coquimbo) southward to Cape Horn and in adjacent Argentine from Neuquén southward. The type was collected by the Forsters on Cook's second voyage, but previous to that time the Magellanic plant had been known from other collections and had been freely mentioned in literature. The old common name of "Winter's bark" is derived from the observations of William Winter, who obtained some specimens from the Straits of Magellan on Drake's voyage in 1578; these specimens were the basis of Dalechamps' and Clusius' discussions cited below. The bark has tonic and antiscorbutic properties and was widely used medicinally in Europe.

I have not been able to limit the species *D. Winteri* to the southern form upon which it was originally based, but on the other hand I prefer not to extend the specific concept to include all the American representatives of the genus. As mentioned in the preliminary portion of this treatment, the specimens of *Drimys* from Chile and adjacent southern Argentine seem sufficiently distinct from the remainder of the population to merit specific recognition as *D. Winteri*. Within this complex, at least three groups are discernible which appear to merit varietal recognition. Although these three groups have different aspects which make them recognizable, these aspects are difficult to analyze and do not have a basis in definite clear-cut characters.

#### ESSENTIAL DIAGNOSTIC CHARACTERS OF THE VARIETIES

- Tree, often compact, sometimes up to 17 m. high; leaves crowded on distal portions of branchlets; branchlets stout, 4–6 mm. in diameter toward apices; petioles stout, 1.5–4 mm. in diameter, 3–15 mm. long; leaf-blades coriaceous or thick-coriaceous, dark brown above when dried, usually pale to dark brown beneath, usually definitely obovate and obviously revolute at margin toward base, the secondary nerves 7–11 per side, ascending at an angle of 35–45°, immersed or sometimes prominulous on both surfaces; flowers single, very rarely umbellate; petals 5–7, 8–15 by 3.5–6(–7) mm.; ovules 10–18; southern Chile (south of lat. 42°) and adjacent Argentine.....2a. var. *punctata*.
- Shrub or small tree, less than 5 m. high, the branches often contorted; leaves evenly distributed along branchlets; branchlets 3–5 mm. in diameter toward apices; petioles 1–2 mm. in diameter, 5–18 mm. long; leaf-blades coriaceous, pale green to olivaceous or pale brown above when dried, conspicuously pale and glaucous beneath, often tending to be elliptic, not conspicuously recurved at margin toward base, the secondary nerves 5–7 per side, ascending at an angle of 35–45°, immersed or faintly prominulous on both surfaces; flowers single, rarely umbellate; petals 4–9, 8–18 by 2.5–5 mm.; ovules 10–12; southern Chile and adjacent Argentine (lat. about 38° to 41°) at high elevations (760–2300 m.).....2b. var. *andina*.
- Shrub or tree 3–15 m. high; leaves evenly distributed along branchlets; branchlets 3–5 mm. in diameter toward apices; petioles 1–3 mm. in diameter, 5–27 mm. long; leaf-blades coriaceous, pale or dark green above when dried, glaucous or at least paler beneath, often essentially oblong, usually conspicuously revolute at margin

toward base, the secondary nerves (5-)7-15 per side, erecto-patent or ascending at an angle of 40-60°, usually prominulous and obvious on both surfaces; inflorescences umbellate, the flowers very rarely single; petals 6-14, 6-20 by 2-5 mm.; ovules 9-16; central Chile (lat. about 30°30' to 44°40') at comparatively low altitudes. . . . . 2c. var. *chilensis*.

- 2a. *Drimys Winteri* var. *punctata* (Lam.) DC. Reg. Veg. Syst. Nat. **1**: 443. 1817, Prodr. **1**: 78. 1824; Hauman in Comun. Mus. Nac. Buenos Aires **2**: 48. 1923; Hauman & Irigoyen in An. Mus. Nac. Buenos Aires **32**: 228. 1923.
- Winteranus cortex* Dalechamps, Hist. Gen. Pl. 1858. 1586; Clus. Exot. 75. 1605; Parkinson, Theatr. Bot. 1652. 1640.
- Laurifolia Magellanica cortice acri* Bauhin, Pinax Theatr. Bot. 461. 1623.
- Arbor laurifoliae Magellanicae* . . . Jonston, Dendr. Hist. Nat. 232. 1662.
- Periclymenum rectum foliis laurinis* . . . Sloan in Phil. Trans. Roy. Soc. London **17**(204): 923. *pl.* 1. 1693.
- Boigue Cinnamomifera oliva fructu* Feuillée, Hist. Pl. Méd. 10. *pl.* 6. 1725.
- Cortex Winteranus* Gars. Fig. Pl. Anim. Med. **1**: 27. *pl.* 35B. 1764.
- Drimys Winteri* J. R. & G. Forst. Char. Gen. 84. *f.* 42, *m-z*. 1776; Forst. f. in Nova Acta Reg. Soc. Sci. Ups. **3**: 181. 1780; L. f. Suppl. 269. 1781; Lam. Encycl. **2**: 331. 1786; DC. Reg. Veg. Syst. Nat. **1**: 443. 1817, Prodr. **1**: 78. 1824; Hayne, Getreue Darst. Arzn. Gewächse, 9. *pl.* 6. 1825; Nees, Pl. Offic. **2**: *pl.* 372 (in text). 1828; Spach, Hist. Nat. Veg. **7**: 438. 1839; Endl. Enchir. Bot. 430. 1841; Hook. f. Fl. Antarct. **2**: 229. 1845; Gay, Fl. Chil. **1**: 63. 1845; Carson, Ill. Med. Bot. **1**: *pl.* 5. 1847; Dec. Bot. Voy. Pole Sud **2**: 64. *pl.* 19 (in Atlas). 1853; A. Gray, Bot. U. S. Expl. Exped. **1**: 24. 1854; Good, Family Flora **2**: *pl.* 89. 1854; Steud. in Flora **39**: 408. 1856; Miers in Ann. Mag. Nat. Hist. III. **2**: 45. 1858, Contrib. Bot. **1**: 135. *pl.* 25A. 1861; Eichl. in Mart. Fl. Bras. **13**(1): 133. 1864; Baill. Hist. Pl. **1**: 157. *f.* 200-202. 1867-69, Traité Bot. Méd. Phan. 503. *f.* 1192-1194. 1884, Dict. Bot. **2**: 474, 475. 1886; Franch. in Bot. Miss. Sci. Cap Horn, 322. 1889; Dujard.-Beaumez & Egasse, Pl. Méd. 249. *f.* 312-315. 1889; Prantl in E. & P. Nat. Pfl. III. **2**: 19. 1891; Reiche, Fl. Chil. **1**: 26. 1896; Speg. in An. Mus. Nac. Buenos Aires **5**: 46. 1896; De Wildem. Bot. Phan. Terres Magel. 18, 102. 1905; Macloskie in Rep. Princeton Univ. Exped. Patagonia **8**: 419. *f.* 71 (excl. fr.). 1905; Pilger in E. & P. Nat. Pfl. Nachtr. **2**: 108. 1906; Karsten & Schenck, Veg.-Bild. **4**: *pl.* 14. 1907; Skottsbo. in Kungl. Sv. Vetens. Handl. **56**(5): 226. 1916; Hauman in Bull. Soc. Bot. Belg. **58**: *pl.* 11. 1926.
- Winterana aromatica* Soland. ex Fothergill in Medical Obs. and Inq. **5**: 46. *f.* 1. 1776; non *Drimys aromatica* F. v. Muell. (1860).
- Wintera aromatica* Murr. Syst. Veg. ed. 14. 507. 1784, Apparat. Medic. **4**: 557. 1787; Forst. f. in Comment. Soc. Reg. Sci. Goett. **9**: 34. *pl.* 7. 1787; Willd. Sp. Pl. **2**: 1239. 1800; Pers. Syn. Pl. **2**: 84. 1806; Humb. & Bonpl. Pl. Aequin. **1**: 209. 1808; Nees, Pl. Offic. **2**: *pl.* 372. 1828.
- Drimys punctata* Lam. Encycl. **2**: 330. 1786, Ill. **2**: *pl.* 494. 1797.
- Drimys aromatique* Descourt. Fl. Pitt. & Med. Ant. **1**: 188. *pl.* 40. 1821.
- Drimys Winteri* f. *magellanica* Eichl. in Mart. Fl. Bras. **13**(1): 134. *pl.* 30, *f.* 2. 1864; Macloskie in Rep. Princeton Univ. Exped. Patagonia **8**: 420. 1905.
- Drimys aromatica* Descourt. ex Baill. Hist. Pl. **1**: 157. 1867-69.
- Drimys polymorpha* Spach ex Baill. Hist. Pl. **1**: 157. 1867-69.
- Drimys Winteri* var. *Morenonis* Kuntze, Rev. Gen. **3**(2): 2. 1898; Macloskie in Rep. Princeton Univ. Exped. Patagonia **8**: 420. 1905.
- Drimys Winterana* Thell. in Bull. Herb. Boiss. II. **8**: 781. 1908.

Tree, often compact, sometimes up to 17 m. high, the branchlets stout, 4-6 mm. in diameter near apices; leaves crowded on distal portions of branchlets; petioles 3-15 mm. long, stout, 1.5-4 mm. in diameter; leaf-blades coriaceous or thick-coriaceous, dark brown above when dried, glaucous to pale or dark brown beneath, obovate or obovate-oblong, (4-)6-13(-14) cm. long, (1.5-)2-5.5(-7) cm. broad, subattenuate to ob-

tuse at base, usually obviously and narrowly revolute at margin toward base, the secondary nerves 7–11 per side, ascending at an angle of 35–45°, immersed or faintly impressed or faintly prominulous above, immersed or prominulous beneath, the veinlets immersed; flowers single, clustered near apices of branchlets, the inflorescences rarely umbellate and then with 2 or 3 flowers on peduncles less than 10 mm. long, the pedicels 10–37 mm. long; sepals 5–7 mm. long, 5–12 mm. broad; petals 5–7, 8–15 mm. long, 3.5–6(–7) mm. broad; stamens 20–35, the filaments 0.8–3 mm. long; carpels 3–9, the ovules 10–18.

DISTRIBUTION: Southern Chile from lat. about 42° (Chiloé) southward to Cape Horn, and in the adjacent Argentine section of Tierra del Fuego. The specimens cited below represent only a fraction of those recorded, as the plant has been obtained by essentially all collectors in the region (see above-cited references by Hauman, Spegazzini, De Wildeman, Skottsberg, etc.). It is apparently abundant at sea-level in the Magellan region, and according to some writers it also ascends the hills to at least several hundred meters. The following citations are arranged, in general, from northwest to southeast.

CHILE: Chiloé: Chiloé I., Huite, *Cunningham* (NY); Aysen: Wellington I., Eden Harbor, *Ball* (NY, US); Magellanes: Cerro Paine, *Donat 398* (F, GH, NY); Straits of Magellan, without detailed locality, *Moreno* (NY, type of *D. Winteri* var. *Morenonis*), *Lenormand* (M), *Andersson* (NY, US), *Douglass* (GH); Penins. Muñoz Gamero, Puerto Tamar, *Safford 358* (US); Penins. Córdova, Borja Bay, *Lee* (US); Brunswick Penins., Fortescue Bay, *Safford* (NY, US); Port Gallant, *Blake* (GH); Punta Arenas, *Blake* (GH); Port Famine, *Lee* (US); Hoste I., Hardy Penins., Orange Bay, *U. S. Expl. Exped.* (GH, M, NY, US), *Hyades* (NY), *Collector?* (F); Hermite I., *Hooker* (F, GH).

ARGENTINE: Tierra del Fuego: La Maire Straits, *Banks & Solander* (co-type coll. of *Winterana aromatica*, GH, US).

NATIVE NAMES: *Canelo*, *ouchkouta* (wood), *liouch* (leaves), *usskúttá*, *ciúla*, *shâahlku*, *shâlakuâhr*. The second and third names were apparently first recorded by Franchet, the last four by Spegazzini.

The first variety founded upon the Magellanic form of *D. Winteri* was var. *punctata*, based upon *D. punctata* Lam. This binomial was based upon a specimen collected by Commerson in the Magellan region, sent to Lamarck by Jussieu. Lamarck's description and plate leave no doubt that this species is identical with the Forsters'. Thus, while the type of the variety is Commerson's plant and the type of the species is the Forsters', there can be no doubt that the same entity is involved and that var. *punctata* is to be construed as the typical variety of the species.

Garsault's name cited above is not intended as a binomial in the Linnaean sense, "cortex" not being proposed as a genus. The entire work of Garsault may be excluded from nomenclatural consideration, since the Linnaean system of binary nomenclature for species was not consistently employed (Int. Rules Bot. Nomenclature Art. 68 [4], 1935). Therefore Thellung's combination *Drimys Winterana*, based on Garsault's "binomial," is not acceptable to supplant the binomial *D. Winteri*.

A great deal of confusion has been caused by Murray's substitution of the binomial *Wintera aromatica* for *Drimys Winteri*. Not liking the generic name *Drimys*, Murray simply substituted *Wintera*, which thus can have no other connotation than as a direct synonym of *Drimys* J. R. & G. Forst. Murray's specific epithet is derived from *Winterana aromatica* Soland.,



published in the same year as *Drimys Winteri* Forst. Which of these two specific epithets has strict priority is not known to me, but at any rate the use of *Drimys aromatica* for the Magellanic plant (as proposed by Baillon in 1867-69) is excluded by the earlier *Drimys aromatica* F. v. Muell. (1860) for an Australian species.

The typical variety of *D. Winteri* is characterized by its stout branchlets, its crowded and coriaceous leaves, of which the petioles are thick and the blades dark brown and usually obovate, with ascending secondaries, and its usually single flowers with comparatively few petals. These few characters impart to the plants an impression quite distinct from that given by the other two varieties described below.

2b. ***Drimys Winteri* var. *andina*** Reiche in Anal. Univ. Chile **100**: 535. Apr. 1898, Fl. Chil. **2**: 371. 1898.

*Drimys Winteri* var. *quinoensis* Kuntze, Rev. Gen. **3**(2): 2. Sept. 1898.

*Drimys Winteri* var. *chilensis* f. *andina* Hauman in Comun. Mus. Nac. Buenos Aires **2**: 50. 1923; Hauman & Irigoyen in An. Mus. Nac. Buenos Aires **32**: 228. 1923.

Shrub or small tree up to 5 m. high, often less than 1 m. high, the branches often contorted, the branchlets 3-5 mm. in diameter near apices; leaves evenly distributed along branchlets; petioles 5-18 mm. long, 1-2 mm. in diameter; leaf-blades coriaceous, pale green to olivaceous or pale brown above when dried, conspicuously pale and glaucous beneath, obovate-oblong or -lanceolate or elliptic, (4-)6-11.5 cm. long, (1.3-)1.8-4.5 cm. broad, acute to attenuate at base, not conspicuously recurved at margin toward base, the secondary nerves 5-7 per side, ascending at an angle of 35-45°, faintly prominulous or immersed on both surfaces, the veinlets immersed; flowers single, rarely 2-4 in umbels (on peduncles up to 25 mm. long), clustered near apices of branchlets, the pedicels 10-70 mm. long; sepals 5-6 mm. long, 5-7 mm. broad; petals 4-9, 8-18 mm. long, 2.5-5 mm. broad; stamens 15-40, the filaments 1-2.5 mm. long; carpels (2-)3-8, the ovules 10-12. (FIG. 2, g-k.)

DISTRIBUTION: Mountains of south-central Chile (Cautín and Valdivia) and adjacent Argentine (common in region of Lake Nahuel Huapí); Reiche also mentions the variety from Llanquihue, and Hauman reports it from the Río Aluminié in Neuquén. The plant is said to occur from 760 to 2300 m., in open woods or in forest, often associated with *Nothofagus* and *Araucaria*.

CHILE: Cautín: Río Quino, Kuntze (NY, type of *D. Winteri* var. *quinoensis*, US); Baños de Trolguaca, Sargent (A, M); along road from Termas de Trolguaca to Laguna Malleco, Morrison & Wagenknecht 17480 (GH); Volcán de Trolguaca, Pennell 12785 (GH); Volcán Llaima, Werdermann 1245 (A, F, GH, M, NY, UC, US); west foot of Volcán Llaima, West 4900 (GH, M, UC); Valdivia: Dept. Osorno, Cordillera Pelada, Morrison 17639 (GH).

ARGENTINE: Río Negro: Region of Lake Nahuel Huapí, Cordini 131 (US); Puerto Blest and vicinity, Cabrera & Job 268 (NY), Parodi 11783 (GH), West 4730 (GH, M); between Puerto Blest and Lake Todos los Santos, Elwes (A); Laguna Frias, Cerro Riggi, Cabrera 6047 (F); Brazo Viento, Cantaros, Lake Nahuel Huapí, Ljungner 947 (NY).

NATIVE NAME: *Canelo*.

The two varietal names *andina* and *quinoensis* were both published in 1898, but the first has priority. Reiche did not cite a type, but there seems no doubt that the present variety is the one described by him.

The var. *andina* is characterized by its small compact habit; it is distinguished from var. *punctata* by having the leaves comparatively spaced, the branchlets and petioles less robust, and the leaf-blades thinner and paler in color and more definitely elliptic, without the strongly recurved basal margins. It is apparently a montane form and in many respects suggests a link between the other two varieties of *D. Winteri*, but on the whole it has sufficiently strong characteristics to make recognition advisable. As a matter of fact, Prof. Bailey's anatomical study of preparations of the leaves of this variety incline him to believe it unusually well marked and homogeneous. He finds it to be more stable and more readily characterized than the other two varieties of *D. Winteri*.

A collection from the vicinity of the south shores of Lake Argentine, Santa Cruz, Argentine (*Furlong 62* [GH, NY]) does not fit well into any of the proposed varieties of *D. Winteri*, but I believe that it is best placed with var. *andina*, although it occurs far south of otherwise known localities of this variety. It differs from the rest of the material of this variety in having the leaf-blades somewhat darker above (as in var. *punctata*), the margins slightly more conspicuously revolute toward base, the secondaries slightly more obvious, the flowers umbellate on peduncles up to 30 mm. long, the stamens only 14 and with unusually large locules, and the ovules 14. I have not included these extreme variations in the above description of var. *andina*. Future collections may permit the more accurate placing of the Furlong specimen.

- 2c. ***Drimys Winteri* var. *chilensis*** (DC.) A. Gray, Bot. U. S. Expl. Exped. **1**: 24. 1854; Eichl. ex Kuntze, Rev. Gen. **3**(2): 2. 1898; Eichl. ex Hauman in Comun. Mus. Nac. Buenos Aires **2**: 49. 1923; Eichl. ex Hauman & Irigoyen in An. Mus. Nac. Buenos Aires **32**: 227. 1923.
- Drimys chilensis* DC. Reg. Veg. Syst. Nat. **1**: 444. 1817; Deless. Ic. Sel. **1**: 22. pl. 83. 1820; DC. Prodr. **1**: 78. 1824; Hook. in Bot. Misc. **3**: 134, *pro parte*. 1832; Gay, Fl. Chil. **1**: 61, *pro parte*. 1845; Carson, Ill. Med. Bot. **1**: pl. 6. 1847; Steud. in Flora **39**: 408. 1856; Miers in Ann. Mag. Nat. Hist. III. **2**: 47. 1858, Contrib. Bot. **1**: 136. pl. 26C. 1861; Pilger in E. & P. Nat. Pfl. Nachtr. **2**: 108. 1906.
- Drimys Winteri* sensu Hook. f. in Curt. Bot. Mag. **80**: pl. 4800. 1854; Demilly in Rev. Hort. n. s. **12**: 18. f. 3, 4. 1912; non J. R. & G. Forst.
- Drimys paniculata* Steud. in Flora **39**: 408. 1856.
- Drimys chilensis* var. *latifolia* Miers in Ann. Mag. Nat. Hist. III. **2**: 47. 1858, Contrib. Bot. **1**: 136. 1861.
- Drimys Winteri* f. *chilensis* Eichl. in Mart. Fl. Bras. **13**(1): 135. pl. 30, f. 1. 1864.
- Drimys magnoliaefolia* Kunth ex Eichl. in Mart. Fl. Bras. **13**(1): 135, as synonym. 1864.
- Drimys Winteri chilensis* Macloskie in Rep. Princeton Univ. Exped. Patagonia **8**: 420, excl. spec. 1905.

Shrub or tree 3–15 m. high, the branchlets 3–5 mm. in diameter toward apices; leaves usually scattered along distal portions of branchlets; petioles 5–27 mm. long, 1–3 mm. in diameter; leaf-blades coriaceous, pale or dark green above when dried, sometimes fuscous, glaucous or at least paler beneath, oblong or obovate-oblong, (5–)9–15(–18) cm. long, (1.5–)2.5–6.5(–7) cm. broad, usually obtuse (or subacute to subtruncate) at base and strongly revolute at margin toward base, the secondary nerves (5–)7–15

per side, erecto-patent or ascending at an angle of 40–60°, usually prominulous and obvious on both surfaces, rarely subimmersed above, the veinlets immersed or obscurely prominulous on both surfaces; inflorescences often densely crowded at apices of branchlets, very rarely axillary, umbellate (flowers occasionally fasciculate, rarely single), the peduncle (0–)8–50 mm. long, the flowers (1–)3–8(–12) per inflorescence, the pedicels 10–55 mm. long, rarely branched and 2-flowered; sepals 4–7 mm. long, 4–9 mm. broad; petals 6–14, 6–20 mm. long, 2–5 mm. broad; stamens 24–35, the filaments 1–2.5 mm. long; carpels 4–10, the ovules 9–16.

DISTRIBUTION: Central Chile, from Coquimbo (lat. about 30°30') to Aysen (lat. about 44°40'), often near the coast, at altitudes up to 700 m. (rarely to 1000 m.). The plant is said to grow in forests or in woods, often in sheltered locations or near water.

CHILE: Coquimbo: Dept. Ovalle, Fray Jorge, *Muñoz B117* (GH); Aconcagua: Valparaiso and vicinity, *Cuming 8644* (NY), *Ball* (NY), *Harvey* (GH), *Buchtien* (US), *Claude-Joseph 3692* (US), *Behn* (F); Las Zorras, near Valparaiso, *Harshberger 1036* (NY, US); Cerro Campana, *Philippi & Borchers* (F); Santiago: Nuñoa, vicinity of Santiago, *Claude-Joseph 1755* (GH, US); Melipilla, *Gay 171* (GH); Esmeralda, near Melipilla, *Reed* (GH); "Winganis," *Hastings 355* (NY, UC, US); Río Clarillo, *Grandjot* (M); Rungue, Cerro El Roble, *Montero 173* (GH, M); Colchagua: Tagua-tagua, *Bertero 229* (type coll. of *D. paniculata*, M, NY); Talca: Camarico, Río Claro, *Moreira* (GH); Río Claro, *Reiche?* (A); Nuble: Chillan, *Philippi* (US); near Racinto, *West 5117* (GH, M, UC); Concepción: Vicinity of Concepción, *Germain* (F); Bio-Bio: Angol, *Kuntze* (NY, US); Cautín: Temuco, *Claude-Joseph 1178* (US); Valdivia: *Philippi* (GH); Valdivia and vicinity, *Buchtien* (UC), *Junge* (M), *Lechler 550* (US); Río Calle-Calle, *Buchtien* (F, US); Corral, *Gunckel 1795* (UC), *3498* (M), *Thaxter* (GH); Amargos, *Gunckel 86* (F); Antilhue, *Sargent* (A); Panguipulli, *Hollermayer 1926* (US); Chiloé: Dept. Llanquihue, road from Hotel Ensenada to Cochamo and Laguna Patos, *Morrison 17580* (GH); Isla de Chiloé, Castro, *Pennell 12605* (GH, NY, US); Aysen: Ins. Magdalena, Calqueman, *Werdermann 73* (A, F, GH, NY, M, UC, US); without definite locality: *Dombey s. n.* or *601* (TYPE COLL. of *D. chilensis*, F), *Gay* (GH).

CULTIVATED SPECIMENS: *Nicholson* (cult. Kew) (A); *Anderson* (cult. J. I. Hort. Institute, England) (M); cult. Hort. Berol. (M); cult. Jardin des Plantes, Caen (US).

NATIVE NAMES: *Canelo*, *boighe*.

Although the specimens cited above cannot be given specific recognition, they appear to represent a well-marked variety of *D. Winteri*, characterized primarily by the slender habit, the numerous and comparatively spreading and obvious secondary nerves of the leaf-blades, the predominantly umbellate inflorescences, and the more numerous petals. The ranges of this variety and var. *punctata* apparently overlap in Chiloé and Aysen, but, in general, var. *chilensis* occurs only toward the north of the range of the species and does not ascend to as high an elevation as is characteristic for var. *andina*.

Prof. Bailey calls my attention to the fact that four of the above-cited specimens (*Muñoz B117*, *West 5117*, *Pennell 12605*, and *Werdermann 73*) demonstrate anatomical characters in the leaf which are more to be expected in var. *punctata* than in var. *chilensis*. However, in the gross morphological characters which I have used to separate the two varieties, the four specimens agree better with var. *chilensis* than with var. *punctata*; that is, they have ample and umbellate inflorescences, comparatively

numerous petals, and more or less spreading secondary nerves. Thus it appears that the anatomical and morphological characters within *D. Winteri* are not always correlated in such a way that the two varieties under discussion are obvious. To be sure, one might expect the occurrence of unusually variable individuals where the ranges of the two varieties overlap, and therefore the disagreement of characters found in the Pennell and Werdermann specimens, from Chiloé and Aysen, is not unexpected. That the West and Muñoz specimens (the latter the most northern known collection of *D. Winteri*) should show anatomical characters of var. *punctata* is a phenomenon which I cannot explain at present.

3. ***Drimys granadensis*** L. f. Suppl. 269. 1781.

Shrub or small tree up to 13 m. high, the branchlets brownish or cinereous, sometimes glaucous when young, rugulose, subterete (or short lateral ones sometimes flattened), 2–7 mm. in diameter toward apices; petioles rugulose, flattened to obviously canaliculate above, often narrowly winged distally, 4–25 mm. long, 1–3 mm. in diameter; leaf-blades thick-coriaceous to subcoriaceous, olivaceous to brown above when dried, glaucous or pale beneath and appearing uniform in color rather than punctate, elliptic-oblong or narrowly so, 5–16(–17.5) cm. long, 1–5.5 cm. broad, acute to attenuate at base and decurrent on the petiole, usually obtuse at apex and narrowly recurved at margin, the costa shallowly canaliculate to nearly plane above, prominent beneath, the secondary nerves 8–19 per side, ascending to erecto-patent, prominulous to immersed on both surfaces, often freely anastomosing, the veinlets immersed or prominulous; inflorescences terminal or axillary, umbellate or fasciculate or 1-flowered, the peduncle often slightly flattened, 7–65(–90) mm. long, the flowers 1–6(–8) per inflorescence, the pedicels 5–60(–90) mm. long; sepals papyraceous to submembranaceous, more or less opaque, usually inconspicuously yellow-glandular, suborbicular-deltoid, 4.5–10(–12) mm. long, 5–11(–13) mm. broad, rounded to obscurely apiculate at apex; petals 8–17(–25), membranaceous or submembranaceous, opaquely yellow-glandular (sometimes obscurely so), oblong to elliptic- or ovate-oblong, 5–20(–25) mm. long, 1.5–8(–11) mm. broad, cuneate to obtuse at base, obtuse at apex; torus short-cylindric, usually conspicuous; stamens 25–50(–65), 2–4(–5)-seriate, the filaments carnose, somewhat flattened, often sparsely yellow-glandular, 0.5–3 mm. long, the connective glandular and usually with a few obvious apical yellow glands, the locules 0.3–1 mm. long; carpels 3–12(–24), obovoid, 2–5 mm. long at anthesis, usually contracted at base, rounded at apex, the stigma subterminal or obliquely terminal on a short stipe 0.3–0.7 mm. long, exceeding the body of the carpel, the ovules 7–12 on short placentas.

**DISTRIBUTION:** Southern Mexico to western Venezuela and Peru; five varieties are here circumscribed. The type of the species was collected by Mutis in Colombia; it falls into the variety *grandiflora*, which thus, although not based upon the type of the species, is nevertheless the typical variety.

In the original publication of this species the name was spelled *granadensis*, but in 1817 De Candolle took up the spelling *granatensis*, which has been followed by most writers using the name. There appears to be no reason for this change, and throughout this paper I have used the original

spelling, regardless of the spelling used by the cited author, in order to avoid further complications of the synonymy. Various writers have accredited the specific name to Mutis, but in the original publication Mutis is mentioned merely as the collector.

ESSENTIAL DIAGNOSTIC CHARACTERS OF THE VARIETIES

Branchlets tending to be thick (3–7 mm. in diameter toward apices); leaf-blades coriaceous or thick-coriaceous, elliptic-oblong, (5–)7–14.5 by (1–)1.5–5.5 cm., with definitely obtuse or subrounded apices, the secondary nerves obvious on both surfaces, rarely obscure, freely anastomosing toward margin; inflorescences axillary or congested toward apices of branchlets but comparatively scattered; flowers usually umbellate, rarely single; sepals thick in texture, never membranaceous, averaging large (6–10[–12] by 7–11[–13] mm.); petals comparatively few, 8–13(–15), large (9–20[–25] by 4–8[–11] mm.); stamens 25–50(–60), the anthers comparatively large, the locules 0.6–1 mm. long; carpels 5–12(–14), 2.5–5 mm. long at anthesis; Colombia.....3a. var. *grandiflora*.

Branchlets 2–5 mm. in diameter toward apices; leaf-blades coriaceous, elliptic-oblong, 5.5–10.5 by 1.5–3.5 cm., rounded or definitely obtuse at apex, the secondary nerves immersed and scarcely visible; flowers single, aggregated at apices of branchlets; sepals submembranaceous, about 8 by 9 mm.; petals about 10, 9–12 by 3–5 mm.; stamens about 30, the anthers with locules 0.5–0.6 mm. long; carpels about 6, 2–2.5 mm. long at anthesis; western Venezuela.....3b. var. *uniflora*.

Branchlets 2–5 mm. in diameter toward apices; leaf-blades subcoriaceous, narrowly elliptic-oblong, (5–)7–16(–17.5) by 1.5–4.5(–5.5) cm., obtuse or subacute at apex, the secondary nerves obvious on both surfaces or usually so, freely anastomosing toward margin; inflorescences aggregated at or near apices of branchlets; flowers umbellate, rarely single; sepals papyraceous to submembranaceous, averaging comparatively small (4.5–8 by 5–9 mm.); petals 9–17, comparatively small (6–17 by 1.5–6 mm.); stamens 25–45(–55), the anthers with locules 0.5–0.8 mm. long; carpels 5–12, 2–3 mm. long at anthesis; southern Mexico to Costa Rica.....3c. var. *mexicana*.

Branchlets 2–4 mm. in diameter toward apices; leaf-blades subcoriaceous, elliptic-oblong, 6–12(–14) by 1.5–4(–5.5) cm., obtuse at apex, the secondary nerves faint but usually visible on both surfaces; inflorescences aggregated near apices of branchlets; flowers umbellate, rarely single; sepals submembranaceous, comparatively small (5–6 by 6–7 mm.); petals numerous, 14–25, small (5–8 by 1.5–2.5 mm.); stamens numerous, 50–65, the anthers small, with locules 0.3–0.5 mm. long; carpels 8–24, about 2 mm. long at anthesis; Chiriquí region in Panama.....3d. var. *chiriquiensis*.

Branchlets about 4 mm. in diameter toward apices; leaf-blades coriaceous, oblong-lanceolate, 5–9 by 1–2 cm., obtuse at apex, the secondary nerves faintly prominulous on both surfaces; inflorescences aggregated at or toward apices of branchlets, the flowers umbellate; sepals submembranaceous, 8–9 mm. long and broad; petals numerous, about 22, the outer and larger ones 10–13 by 5–7 mm.; stamens about 40, the locules 0.6–0.7 mm. long; carpels 3–7, 2–2.5 mm. long at anthesis; Peru.....3e. var. *peruviana*.

3a. *Drimys granadensis* var. *grandiflora* Hieron. in Bot. Jahrb. **20**: Beibl. 49: 10, as *D. granatensis* Mutis var. g. 1895.

*Drimys granadensis* L. f. Suppl. 269. 1781; Lam. Encycl. **2**: 330. 1786; DC. Reg. Veg. Syst. Nat. **1**: 444. 1817; H. B. K. Nov. Gen. & Sp. **5**: 53. 1821; DC. Prodr. **1**: 78. 1824; Endl. Enchir. Bot. 430. 1841; Miers in Ann. Mag. Nat. Hist. III. **2**: 43. 1858, Contrib. Bot. **1**: 133. *pl.* 27A. 1861; Tr. & Pl. in Ann. Sci. Nat. IV. **17**: 24. 1862; Cortés, Fl. Colomb. **1**: 86. 1898; Pilger in E. & P. Nat. Pfl. Nachtr. **2**: 108. 1906; U. S. Bur. Pl. Industr. Pl. Immigr. **132**: 1148. 1917.

*Wintera granadensis* Murr. Syst. Veg. ed. 14. 507. 1784; Willd. Sp. Pl. **2**: 1239. 1800; Pers. Syn. Pl. **2**: 84. 1806; Humb. & Bonpl. Pl. Aequin. **1**: 205. *pl.* 58. 1808.

*Drimys Winteri* f. *granadensis* Eichl. in Mart. Fl. Bras. **13**(1): 135. *pl.* 31, *f.* 1. 1864.  
*Drimys Winteri* var. *granadensis* Eichl. ex Dusén in Arch. Mus. Nac. Rio **13**: 62,  
 excl. spec. 1905; Pittier, Man. Pl. Us. Venez. 159. 1926.

Tree (or sometimes shrub) up to 13 m. high, the branchlets stout (3–7 mm. in diameter toward apices); leaves scattered along branchlets; petioles 5–15 mm. long, often stout (1–3 mm. in diameter); leaf-blades coriaceous, or thick-coriaceous, usually shining and fuscous above when dried, elliptic-oblong, (5–)7–14.5 cm. long, (1–)1.5–5.5 cm. broad, obtuse or subrounded at apex, usually sharply but narrowly recurved at margin, often strongly so toward base, the secondary nerves 8–19 per side, ascending or erecto-patent at an angle of 40–60°, prominulous or nearly plane above, prominulous and obvious (rarely obscure) beneath, freely anastomosing toward margin, the veinlets immersed above, faintly prominulous or obscure beneath; inflorescences near apices of branchlets but not crowded at actual apex, umbellate or sometimes 1-flowered or fasciculate, the peduncle 16–50(–90) mm. long, the flowers 3–6 per inflorescence (or single), the pedicels 15–60(–80) mm. long; sepals papyraceous, 6–10(–12) mm. long, 7–11(–13) mm. broad (or slightly narrower when 3 rather than 2); petals 8–13(–15), 9–20(–25) mm. long, 4–8(–11) mm. broad; stamens 25–50(–60), the filaments 1.2–3 mm. long, the locules 0.6–1 mm. long; carpels 5–12(–14), 2.5–5 mm. long at anthesis, the ovules 7–12.

DISTRIBUTION: Mountainous parts of Colombia, in all three Cordilleras, in temperate forests, shrub-zone (paramillo), or on slopes of páramos, at altitudes of 1500–3300 m.; common in parts of the range, especially in Cundinamarca. It is reported as occurring near the tree-line, being often found in association with such typical páramo plants as species of *Espeletia*.

COLOMBIA: N o r t e d e S a n t a n d e r : Between Pamplona and Toledo (divide between Maracaibo and Orinoco drainage), *Killip & Smith 19897* (A, GH, NY, US); S a n t a n d e r : Western slope of Páramo Rico, *Killip & Smith 17817* (A, GH, NY, US); C u n d i n a m a r c a : Vicinity of Bogotá, *Triana* (NY, US), *Hartweg 877* (NY), *Holton 673* (GH, NY), *Dawe 140* (US), *Ariste-Joseph* (US), *Schultze 14* (US), *Cuatrecasas 5440* (US); Guadelupe, above Bogotá, *Ariste-Joseph* (US); San Miguel, W. of the savanna of Bogotá, *Cuatrecasas 6687* (US); Monserrate, near Bogotá, *García 4813* (US); Fuentes de San Francisco, *Ariste-Joseph A106* (GH, US); Sibaté, *Popenoe 1109* (US); western slopes of Páramo de Cruz Verde, *Cuatrecasas 343* (US); Páramo de Guasca, *García 6278* (US), *Killip 34077* (A, US), *Balls 5749* (US); above Ubague, *Pennell 1897* (GH, NY, US); Usaquén, *García 8087* (US); T o l i m a : "Rosalito," near Páramo de Ruiz, *Pennell 2963* (GH, M, NY, US); A n t i o q u i a : Vicinity of Medellín, *Toro 718* (NY); Santa Elena, *Archer 1202* (US); San Pedro, *Daniel & Tomás 1255* (A), *1305* (F); C a l d a s : "Pinares," above Salento, *Pennell 9222* (GH, NY, US); E l C a u c a : Río Paez basin, *Pittier 1367* (US); Mt. El Trueno, *Pennell 7542* (GH); "Paletara," *Pennell 6945* (GH, NY, US); w i t h o u t d e f i n i t e l o c a l i t y : *Mutis 1049* (US), *2525* (US), *3839* (TYPE COLL. of *D. granadensis* L. f., US)<sup>1</sup>, *4483* (US), *4609* (US), *Purdie* (GH).

NATIVE NAMES: *Canelo*, *canela de páramo*, *ají*, *palo de ají*, *quinon*, *cupis*. Several writers have briefly mentioned the tonic and stimulant qualities of this plant.

The first varietal name which appears referable to the biological entity described above is Hieronymus' var. *grandiflora*. The original description of this variety clearly indicates that the typical form of the species (as

<sup>1</sup>In sorting the Mutis collection in the Madrid Herbarium, Mr. E. P. Killip assigned arbitrary numbers to the specimens. He has selected the best Mutis specimen of this species as the type; all the Mutis numbers here cited are essentially identical.

represented by Mutis' material) was under consideration. The type of the variety is *Lehmann 7469* from Sibaté, Dept. Cundinamarca; this variety must be construed also to include the Mutis type of the species. Dusén's reference to *D. Winteri* var. *granadensis*, although accompanied by citations of Brazilian specimens, appears to be the first use of the epithet *granadensis* as a variety; Eichler's earlier use of this epithet in a trinomial was as a form.

3b. *Drimys granadensis* var. *uniflora* (Turcz.) comb. nov.

*Drimys uniflora* Turcz. in Bull. Soc. Nat. Mosc. **27**(2): 280. 1854; Pilger in E. & P. Nat. Pfl. Nachtr. **2**: 108. 1906; Knuth in Rep. Sp. Nov. Beih. **43**: 331. 1927.

Small tree (?), the branchlets 2–5 mm. in diameter toward apices; leaves scattered along branchlets or somewhat crowded toward apices; petioles 8–20 mm. long, 1–1.5 mm. in diameter, swollen toward base; leaf-blades coriaceous, olivaceous to pale brown above when dried, elliptic-oblong, 5.5–10.5 cm. long, 1.5–3.5 cm. broad, rounded or obtuse at apex, narrowly recurved at margin, more conspicuously so toward base, the secondary nerves 8–12 per side, erecto-patent at an angle of about 45°, usually immersed and obscure on both surfaces, sometimes faintly prominulous beneath, the veinlets immersed; flowers single, clustered at apices of branchlets, the pedicels 25–50 mm. long; sepals submembranaceous, about 8 mm. long and 9 mm. broad; petals about 10, 9–12 mm. long, 3–5 mm. broad; stamens about 30, the filaments carnose, somewhat flattened, 1–1.5 mm. long, the locules 0.5–0.6 mm. long; carpels about 6, 2–2.5 mm. long at anthesis, the carpel-wall densely glandular, the ovules 9 or 10.

DISTRIBUTION: State of Trujillo, Venezuela; known only from the type collection.

VENEZUELA: T r u j i l l o : Near Agua d'Obispo, alt. about 2700 m., *Linden 1444* (TYPE COLL., F, GH).

As pointed out in the preceding diagnoses of varietal characters, var. *uniflora* differs from the typical Colombian variety chiefly in its more slender habit, obscure secondary nerves, single and terminal flowers, thinner sepals, slightly smaller petals, smaller anther-locules, and smaller carpels at anthesis. On the basis of the present material, the Trujillo specimen is maintained as a variety, but its status cannot be satisfactorily decided without more ample material from the Venezuelan Andes. The weakness of such a character as single versus umbellate flowers is indicated by such a collection as *Killip & Smith 19897*, from the part of Colombia adjacent to Venezuela. This collection has some branchlets with ample and obviously umbellate inflorescences, while other branchlets have the flowers consistently solitary, either fasciculate or single. The leaves of this collection also tend to resemble those of *Linden 1444*, having the secondaries only weakly apparent; nevertheless the inflorescences (or single flowers) are scattered along the branchlets and not aggregated at apices.

3c. *Drimys granadensis* var. *mexicana* (DC.) comb. nov.

*Drimys mexicana* DC. Reg. Veg. Syst. Nat. **1**: 444. 1817; Moc. & Sessé ex DC. Prodr. **1**: 78. 1824; Hemsl. Biol. Centr. Am. Bot. **1**: 14. 1879.

*Drimys granadensis* var. *sylvatica* sensu Schlechtend. & Cham. in Linnaea **5**: 211. 1830; Hemsl. Biol. Centr. Am. Bot. **1**: 14. 1879; non St. Hil.

*Drimys Winteri* sensu Goyena, Fl. Nicar. 172. 1909; Standl. in Contr. U. S. Nat. Herb. **23**: 276. 1922, in Field Mus. Publ. Bot. **18**: 438. 1937; non J. R. & G. Forst.

Shrub or tree 2–13 m. high; branchlets 2–5 mm. in diameter near apices;

leaves usually scattered on branchlets; petioles (5-)8-25 mm. long, 1-2 mm. in diameter; leaf-blades subcoriaceous, shining or dull and fuscous or dark green above, narrowly elliptic-oblong, (5-)7-16(-17.5) cm. long, 1.5-4.5(-5.5) cm. broad, obtuse or subacute at apex, slightly recurved at margin, often strongly but narrowly revolute toward base, the secondary nerves (8-)10-16 per side, ascending or erecto-patent at an angle of 40-55(-60)°, prominulous or nearly plane above, usually obvious, prominulous and obvious beneath, freely anastomosing near margin, the veinlets immersed or faintly prominulous; inflorescences aggregated at or near apices of branchlets, umbellate or rarely 1-flowered, the peduncle 7-65(-75) mm. long, the flowers (1-)2-6(-8) per inflorescence, the pedicels 5-60 mm. long (up to 90 mm. when flowers are single); sepals submembranaceous to papyraceous, 4.5-8 mm. long, 5-9 mm. broad; petals 9-17, 6-17 mm. long, 1.5-6 mm. broad; stamens 25-45(-55), the filaments sometimes yellow-glandular, often eglandular, 0.7-3 mm. long, the locules 0.5-0.8 mm. long, lateral to oblique; carpels 5-12, 2-3 mm. long at anthesis, the ovules 7-12. (FIG. 3, b-f.)

DISTRIBUTION: Southern Mexico (Veracruz and Guerrero) to Costa Rica, in mountains at altitudes of 1150-3000 m.; usually occurring in moist forest, but noted in oak and pine forest in Guerrero by Hinton; common in Costa Rica.

MEXICO: Veracruz: Inter Huatamalco et Tinzutlan (Teziutlán?), *Liebmann 1984* (US); Guerrero: Distr. Galeana, Teotepec, *Hinton 14441* (F, GH); Distr. Galeana, Piedra Ancha, *Hinton 14235* (GH); Oaxaca: Distr. Feotitlán, Cumbre de los Frailes, *Conzatti 2101* (F, US); Distr. Cuicatlán, Cerro La Raya, Cuyamecalco, *Conzatti 3475* (US); northwestern slope of Mt. Zempoaltepec, *Nelson 666* (US); Chiapas: *Ghiesbreght 117* (GH, NY); Cerro de Huitepec, *Ghiesbreght 518* (GH, M); Saxchanal, Sierra Madre, *Matuda 4287* (M, NY); State? : Laguna de Tanetze, *Hartweg 444* (NY).

GUATEMALA: Zacapa: Summit of Sierra de las Minas, vicinity of Finca Planados, *Steyermark 29993* (F).

NICARAGUA: No specimens seen; the fact that Goyena mentions *D. "Winteri"* in his *Flora Nicaragüense* indicates that he probably saw a specimen of the present variety from that country.

COSTA RICA: Páramos del Abejónal, *Tonduz 7897* (US); Tijar, *Quirós 152* (F); El Roble, *Stork 2034* (F); Alajuela: Palmira, Alfaro Ruiz, *Austin Smith 4139* (F), *A123* (F, M), *H524* (F); vicinity of Fraijanes, *Standley & Torres 47632* (US); Volcán de Poas and vicinity, *Tonduz 10937* (US), *Standley 34604* (NY, US), *Stork 2503* (F), *Allen 599* (A, F); Vara Blanca de Sarapiquí, *Skutch 3585* (M, NY); Heredia: Volcán de Barba, *Pittier 2130* (US); Cerro de Las Lajas, north of San Isidro, *Standley & Valerio 51443* (A, US); Cerros de Zurquí, northeast of San Isidro, *Standley & Valerio 50414* (US), *50617* (US), *50635* (US); San José: La Palma de San Ramón, *Brenes 4078* (F), *4122* (F), *4452* (F), *5718* (F); Santa Rosa de Copey, *Tonduz 7342* (12174) (GH, NY, US); above Los Lotes, north of El Copey, *Standley 42578* (US), *42798* (US); Las Nubes, *Standley 38789* (US), *Valerio 1398* (F); Laguna de la Chonta, northeast of Santa María de Dota, *Standley 42319*; Cerro de las Vueltas, *Standley & Valerio 43654* (US); north of El Alto de Cabeza de Vaca, on Río Sució, *Dodge & Thomas 4948* (M); Cerros del Iscazú, *Pittier 7338* (12300) (GH, US); Cerro Gallito, *Valerio 1005* (F); Cartago: Cartago and vicinity, *Stevens 79* (US), *Stork 367* (US), *404* (US); Alto de La Estrella, *Standley 39058* (US); southern slope of Volcán Irazú, *Standley 36628* (US); Santa Clara, *Torres 185* (F).

CULTIVATED SPECIMEN: *Zabel* (cult. Bot. Gart. Muenden) (A).

NATIVE NAMES: *Chilillo*, *chachaca*, *palo picante*, *palo de chile*, *muelo* (in Mexico); *quiebra-muelas*, *chile*, *muelo* (in Costa Rica). Standley reports on native medicinal uses in the cited discussions of *D. Winteri*.



While this entity does not appear to merit specific recognition, it nevertheless has certain tendencies which permit its separation from the Colombian variety. In general, it is more slender in habit, with thinner and proportionately narrower leaf-blades, these tending to be more pointed at apex. The sepals are usually thinner in texture and smaller on the average, the petals are more numerous (on the whole) and somewhat smaller, the anther-locules average smaller, and the carpels are smaller at anthesis.

The above-mentioned characters are far from satisfactory as varietal criteria, but nevertheless the two entities, when ample material is examined, give different impressions, and one is generally able to place specimens without knowledge of the geographic source. There appear to be no differences of consequence between Mexican and Costa Rican specimens.

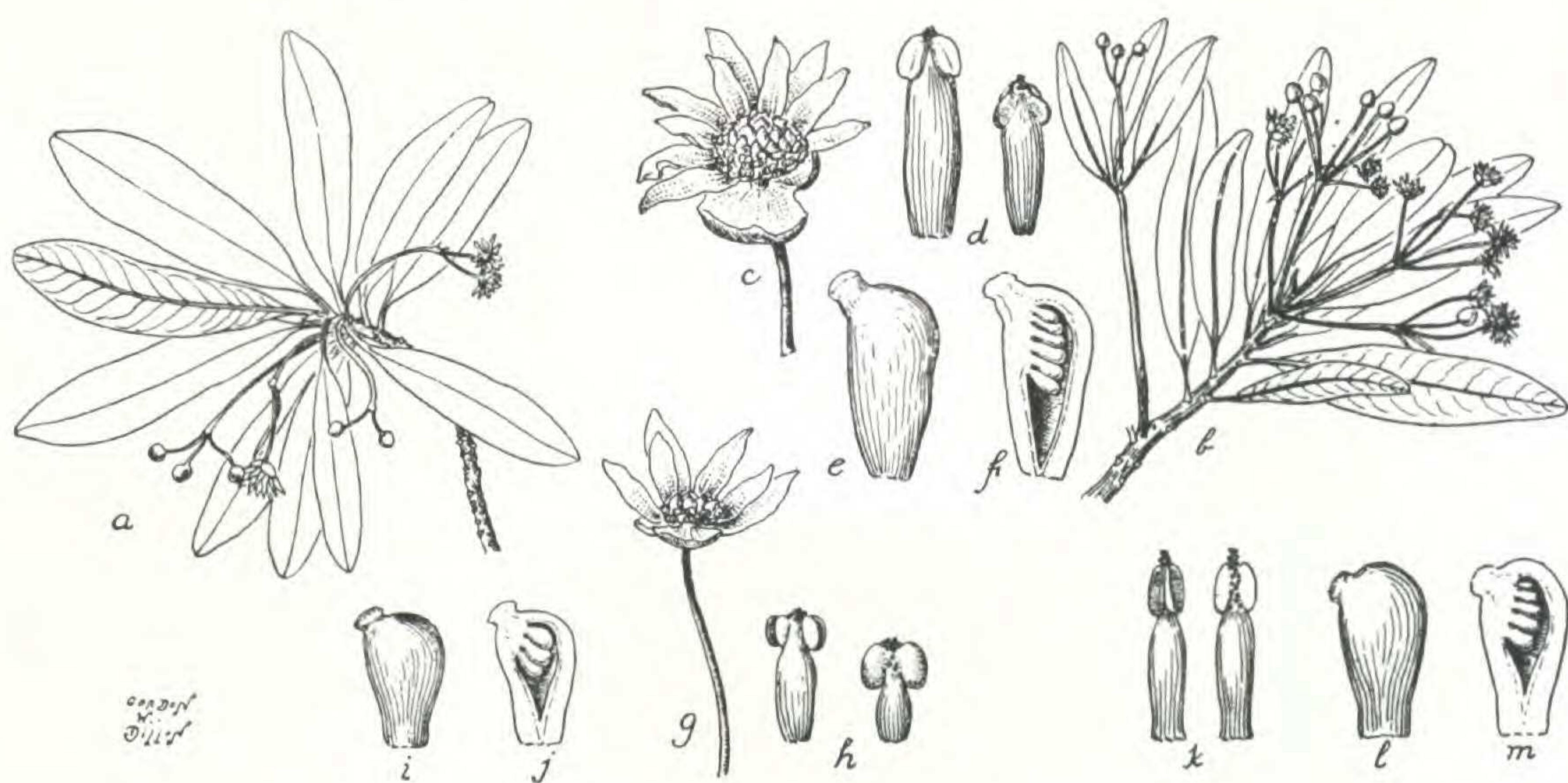


FIG. 3. a. *Drimys granadensis* var. *chiriquiensis*, drawn from the type: flowering branchlet,  $\times \frac{1}{4}$ . b-f. *Drimys granadensis* var. *mexicana*, drawn from *Skutch 3585*: b. flowering branchlet,  $\times \frac{1}{4}$ ; c. flower, with some petals removed,  $\times 1$ ; d. stamens, extrorse and introrse views,  $\times 5$ ; e. carpel,  $\times 5$ ; f. carpel, longitudinal section,  $\times 5$ . g-j. *Drimys brasiliensis* var. *campestris*, drawn from *Mexia 5791*: g. flower, with some petals removed,  $\times 1$ ; h. stamens, extrorse and introrse views,  $\times 5$ ; i. carpel,  $\times 5$ ; j. carpel, longitudinal section,  $\times 5$ . k-m. *Drimys brasiliensis* var. *roraimensis*, drawn from the type: k. stamens, extrorse and introrse views,  $\times 5$ ; l. carpel,  $\times 5$ ; m. carpel, longitudinal section,  $\times 5$ .

3d. *Drimys granadensis* var. *chiriquiensis* var. nov.

Frutex vel arbor parva, ramulis apicem versus 2-4 mm. diametro, saepe conspicue cicatricosis; foliis apicem ramulorum versus plerumque confertis; petiolis 4-20 mm. longis, 1-2 mm. diametro; laminis subcoriaceis, supra in sicco olivaceis vel pallide brunneis, elliptico-oblongis, 6-12(-14) cm. longis, 1.5-4(-5.5) cm. latis, apice obtusis, margine anguste et basim versus conspicue recurvatis, nervis secundariis utrinsecus 8-14 sub angulo 50-65° erecto-patentibus supra prominulis vel subimmersis subtus immersis vel leviter prominulis, marginem versus obscure anastomosantibus, venulis immersis; inflorescentiis apicem ramulorum versus axillaribus umbellatis vel raro 1-floris, pedunculo 10-45 mm. longo, floribus (1-)2-4 per inflore-

scentiam, pedicellis 7–30 mm. longis; sepalis submembranaceis, 5–6 mm. longis, 6–7 mm. latis; petalis 14–25, 5–8 mm. longis, 1.5–2.5 mm. latis; staminibus 50–65, 3–5-seriatis, filamentis eglandulosis 0.5–1.2 mm. longis, connectivo glandulas luteas 2 vel 3 interdum obscuras apice gerente, loculis 0.3–0.5 mm. longis; carpellis 8–24 falcato-ellipsoideis vel obovoideis sub anthesi circiter 2 mm. longis, ovulis 10–12. (FIG. 3, a.)

DISTRIBUTION: Known only from Chiriquí, Panama.

PANAMA: Chiriquí: Bajo Chorro, Boquete District, alt. about 1800 m., *Davidson* 127 (A, TYPE, F), Jan. 14, 1938 (shrub or tree, in rain-forest; petals white; stamens yellow), *Davidson* 328 (A, F, M) (small tree, in rain-forest); between Alto de las Palmas and top of Cerro la Horqueta, alt. 2100–2268 m., *Pittier* 3232 (US) (in humid forest).

The biological entity described above is more closely related to var. *mexicana* than to other varieties of *D. granadensis*. It is characterized by its comparatively small and aggregated leaves and small floral parts, but principally by the unusual number of its petals, stamens, and carpels. The type specimen is extraordinary in having as many as 25 petals, 65 stamens, and 24 carpels, but other cited specimens show that substantial variation in these numbers is to be expected. On the whole, the Chiriquí specimens show such definite trends in the direction indicated above that they seem worthy of varietal recognition.

3e. *Drimys granadensis* var. *peruviana* var. nov.

Frutex ad 70 cm. altus, ramulis apicem versus circiter 4 mm. diametro; foliis secus ramulos dispositis, petiolis 6–11 mm. longis, 1–2 mm. diametro, basim versus paullo incrassatis; laminis coriaceis, supra in sicco olivaceis et nitidis, oblongo-lanceolatis, 5–9 cm. longis, 1–2 cm. latis, apice obtusis, margine anguste revolutis vel abrupte recurvatis, nervis secundariis utrinsecus 12–15 angulo 45–50° erecto-patentibus supra leviter prominulis vel immersis subtus plerumque prominulis, venulis immersis; inflorescentiis ramulorum apice vel apicem versus aggregatis umbellatis, pedunculo crasso 8–17 mm. longo, floribus 3–5 per inflorescentiam, pedicellis 17–25 mm. longis; sepalis submembranaceis, 8–9 mm. longis et latis; petalis circiter 22 et 3-seriatis, exterioribus 10–13 mm. longis et 5–7 mm. latis, interioribus paullo minoribus; staminibus circiter 40, filamentis 1–1.5 mm. longis, connectivo glandulas 2 vel 3 apice plerumque gerente, loculis 0.6–0.7 mm. longis; carpellis 3–7, sub anthesi 2–2.5 mm. longis, ovulis plerumque 12.

DISTRIBUTION: Known only from the type collection, Dept. Cajamarca, Peru.

PERU: Cajamarca: Prov. Cutervo, trail between Socota and Tambillo, alt. 3200 m., *Stork & Horton* 10167 (UC, TYPE), Dec. 14, 1938 (xerophyllous shrub to 70 cm. high, in shrub-land; petals white; stamens yellow; leaves nearly pure white beneath; only one specimen observed).

The single Peruvian specimen described above is characterized by narrow oblong-lanceolate leaf-blades, numerous and comparatively short and broad petals, and comparatively few and small carpels. Its position in *D. granadensis* is indicated by such characters as the glandular anther-connective and the texture of the lower leaf-surface. It seems amply distinguished from the bulk of the population referred to this species, but this conclusion should be further checked when additional collections of *Drimys* are made in Peru and Ecuador.

4. *Drimys brasiliensis* Miers in Ann. Mag. Nat. Hist. III. **2**: 47. 1858, Contrib. Bot. **1**: 136. 1861; Pilger in E. & P. Nat. Pfl. Nachtr. **2**: 108. 1906.  
*Drimys granadensis* sensu St. Hil. Pl. Us. Bras. *pl.* 26-28. 1825, Fl. Bras. Merid. **1**: 24. 1825; Spach, Hist. Nat. Veg. **7**: 437. 1839; non L. f.

Shrub or small tree, the branchlets brownish or cinereous (or subglaucous when young), rugulose, subterete, comparatively slender (1.5-5 mm. in diameter toward apices); petioles rugulose, shallowly canaliculate; leaf-blades coriaceous or thin-coriaceous, glaucous beneath or at length pale brown, often papillate beneath with minute club-shaped or knob-like papillae, not obviously punctate, variously shaped, often elliptic-obovate, sometimes nearly lanceolate, rarely exceeding 11 cm. in length and 4 cm. in breadth, acute or attenuate at base and decurrent on the petiole, rounded or broadly obtuse or emarginate at apex, more or less recurved to revolute at margin, the costa nearly-plane or shallowly canaliculate above, prominent beneath, the secondary nerves 6-10(-14) per side, erecto-patent or spreading, sometimes immersed and obscure; inflorescences terminal or axillary, usually umbellate (flowers sometimes single or fasciculate), the peduncle less than 40 mm. long, the flowers up to 6 per inflorescence, the pedicels 5-40 mm. long (50-80 mm. in var. *roraimensis*); sepals membranaceous to papyraceous, usually obscurely glandular, 4-7 mm. long, 4-8 mm. broad, rounded to apiculate at apex; petals 8-14 (rarely to 20), membranaceous, opaquely yellow-glandular, oblong to elliptic-oblong, 6-17 mm. long, 2-6 mm. broad, obtuse at apex; stamens 18-50, 2-4-seriate, the filaments carnose, somewhat flattened, 0.5-2.5 mm. long, the connective glandular, often conspicuously yellow-glandular at apex, the locules ellipsoid, 0.4-0.8 mm. long; carpels 3-9(-13), obovoid, 1.5-2.5 mm. long at anthesis, rounded at apex, the stigma lateral near apex or subterminal, usually short-stipitate (sessile in var. *roraimensis*), the ovules 6-12, on short placentas.

DISTRIBUTION: Southeastern Brazil and adjacent Paraguay and Argentine, with one variety from Mt. Roraima on the boundary of Venezuela, Brazil, and British Guiana; four varieties are recognizable. The type of *D. granadensis* var. *campestris* St. Hil., for reasons pointed out below, is here selected as the type of *D. brasiliensis* and its typical variety (var. *campestris*).

The Brazilian population of *Drimys* was first treated by St. Hilaire, who considered his Brazilian specimens to be conspecific with the Colombian ones (*D. granadensis*) and different from the Chilean-Magellanic ones (*D. Winteri*). St. Hilaire recognized four Brazilian varieties. He considered the most common of these to be var. *campestris*, which is described in detail, whereas the remaining varieties are discussed only as to their points of difference. As long as these varieties are considered under *D. granadensis*, the question of the typification of a Brazilian species does not arise. But Miers, in erecting *D. brasiliensis*, founded it upon St. Hilaire's concept (exclusive of var. *montana*, which Miers considered specifically distinct) without designating which of St. Hilaire's varieties he wished to accept as the type.

The Brazilian plant has not generally been considered as a species, and as far as I can ascertain no author has attempted definitely to typify it. Hauman was content to accept it as outlined by Miers, with the difference that he again submerged var. *montana*. Since no author has selected a type for *D. brasiliensis*, it therefore becomes necessary to do so. St. Hilaire clearly

considered var. *campestris* to be the most common of his Brazilian varieties, and since this variety is the only one he fully described, I believe that it may be taken as the principal basis of St. Hilaire's concept and considered the type of *D. brasiliensis* Miers.

Var. *campestris* is said to grow in Minas Geraes, but no definite locality is given. It grows "dans les lieux découverts (*campos*), le plus souvent sur le bord des ruisseaux." A specimen in the herbarium of the New York Botanical Garden, collected by St. Hilaire and marked "*Drymis Granatensis* var. *campestris*," may thus be taken as a portion of the type collection of *D. brasiliensis* Miers.

St. Hilaire's second variety, var. *sylvatica*, is said to differ from var. *campestris* in having its leaf-blades proportionately narrower and its petals larger. A comparison of St. Hilaire's two plates discloses only inconsequential individual differences. A portion of the type collection of this variety (NY) also shows that the differences between it and var. *campestris* are trivial. I have no hesitation in submerging var. *sylvatica*.

St. Hilaire's third variety, var. *axillaris*, is said to occur in the vicinity of Villa Rica ("sur les montagnes ferrugineuses"). It is not illustrated, nor have I seen specimens referable to it, but I find only the most inconsequential individual differences pointed out in St. Hilaire's description.

St. Hilaire's fourth variety, var. *montana*, is said to occur in the mountains of the Serra Negra, on the boundary of the States of Minas Geraes and Rio de Janeiro. It is said to be characterized by small leaves and reduced (and sometimes 1-flowered) inflorescences, which are axillary rather than terminal. These differences also appear to be trivial, and I find no reason to maintain the variety.

The Brazilian specimens were next considered by Miers, who proposed the name *D. brasiliensis* to include three of St. Hilaire's four varieties (excluding var. *montana*). The varietal names were transferred from *D. granadensis* to *D. brasiliensis* by Miers without comment. Var. *montana* was erected as a distinct species by Miers, who differentiated it on the grounds that ". . . it differs from *D. brasiliensis*, not only in the size and form of its leaves, but in its axillary inflorescence, and in the number of the parts of its smaller flowers." These differences appear to be entirely inconsequential, the matter of axillary versus terminal inflorescence being susceptible to great variation in *Drimys*, and the number and size of floral parts being dependable only within very broad limits. The variation in the size and shape of leaves is often conspicuous even on the same individual. Therefore I have no hesitation in referring *D. montana* to *D. brasiliensis* as a synonym.

The remaining Brazilian specimens available to Miers were placed in two species, *D. retorta* and *D. angustifolia*. Both are very much reduced in foliage and appear to be reasonably good varieties of *D. brasiliensis*.

Eichler considered the genus as a whole, referring all the American specimens to *D. Winteri*. He considered the bulk of the Brazilian material to be identical with the Colombian plants, which he referred to the forma *granadensis*. However, he recognized Miers' two species *D. retorta* and

*D. angustifolia* to the extent of keeping them as forms of *D. Winteri* (the first as f. *revoluta*); both are well illustrated in Flora Brasiliensis.

Hauman, in discussing the occurrence of *D. brasiliensis* in the Argentine, recognized two varieties, based respectively on St. Hilaire's varieties *campestris* and *montana*. The differences pointed out by him seem inconsequential when an extensive series of collections is considered.

On the basis of the material available to me, and taking into consideration previous descriptions and illustrations of this complex, I believe that the bulk of the Brazilian material may be referred to a single variety, designated as var. *campestris*, the typical variety of the species. Miers' two species *D. retorta* and *D. angustifolia* are given varietal rank, and a fourth very distinct variety is described on the basis of collections from Mt. Roraima.

#### ESSENTIAL DIAGNOSTIC CHARACTERS OF THE VARIETIES

Leaf-blades narrowly elliptic-obovate or oblong or elliptic, (3-)4-11(-14) cm. long, (0.8-)1.2-4(-5) cm. broad, rounded or broadly obtuse or faintly emarginate at apex, usually narrowly recurved at margin, rarely revolute, the secondary nerves prominulous or immersed, usually visible, erecto-patent at an angle of 40-50°; inflorescences usually terminal and umbellate, the peduncle up to 40 mm. long, the pedicels 5-40 mm. long; stamens with a truncate connective; stigma short-stipitate; Bahia to Paraguay, Misiones, and Rio Grande do Sul. . . . . 4a. var. *campestris*.

Leaf-blades narrowly elliptic- or oblong-lanceolate, (2-)2.5-5.5 cm. long, (0.2-)0.3-1.5 cm. broad, usually conspicuously emarginate at apex, strongly revolute at margin, the secondary nerves completely immersed and obscure; inflorescences usually appearing axillary, the peduncle inconspicuous, up to 15 mm. long, the pedicels 15-33 mm. long; stamens with a truncate connective; stigma short-stipitate; Minas Geraes and São Paulo. . . . . 4b. var. *retorta*.

Leaf-blades elongate- or linear-lanceolate, 4-10 cm. long, 0.5-0.6 cm. broad, obtuse or faintly emarginate at apex, slightly recurved at margin but essentially plane, the secondary nerves completely immersed and obscure; inflorescences terminal, the flowers usually single; southeastern Brazil . . . . . 4c. var. *angustifolia*.

Leaf-blades oblong-elliptic, 6-11 cm. long, 2.5-5 cm. broad, obtuse or rounded at apex, faintly recurved at margin, the secondary nerves usually prominulous on both sides, spreading at an angle of 55-70°; inflorescences axillary, the flowers single or paired on a slender peduncle, the pedicels 50-80 mm. long; stamens with the connective apiculate, densely glandular, and exceeding the locules by about 0.15 mm.; stigma sessile; Mt. Roraima. . . . . 4d. var. *roraimensis*.

4a. ***Drimys brasiliensis* var. *campestris*** (St. Hil.) Miers in Ann. Mag. Nat. Hist. III. 2: 48. 1858, Contrib. Bot. 1: 137. *pl.* 25B (as *D. brasiliensis*). 1861; Hauman in Comun. Mus. Nac. Buenos Aires 2: 50. 1923; Hauman & Irigoyen in An. Mus. Nac. Buenos Aires 32: 226. 1923.

*Drimys granadensis* var. *campestris* St. Hil. Pl. Us. Bras. *pl.* 26. 1825, Fl. Bras. Merid. 1: 25. 1825.

*Drimys granadensis* var. *sylvatica* St. Hil. Pl. Us. Bras. *pl.* 27. 1825, Fl. Bras. Merid. 1: 25. 1825.

*Drimys granadensis* var. *axillaris* St. Hil. Pl. Us. Bras. sub *pl.* 26. 1825, Fl. Bras. Merid. 1: 25. 1825.

*Drimys granadensis* var. *montana* St. Hil. Pl. Us. Bras. *pl.* 28. 1825, Fl. Bras. Merid. 1: 25. 1825.

*Drimys Winteri* sensu Vell. Fl. Flum. 240. 1825, Fl. Flum. Ic. 5: *pl.* 132. 1827; non J. R. & G. Forst.

*Drimys granadensis* sensu Spach, Hist. Nat. Vég. Phan. Atlas, *pl.* 60. 1846; non L. f.

*Drimys brasiliensis* var. *sylvatica* Miers in Ann. Mag. Nat. Hist. III. **2**: 48. 1858, Contrib. Bot. **1**: 137. 1861.

*Drimys brasiliensis* var. *axillaris* Miers in Ann. Mag. Nat. Hist. III. **2**: 48. 1858, Contrib. Bot. **1**: 137. 1861.

*Drimys montana* Miers in Ann. Mag. Nat. Hist. III. **2**: 44. 1858, Contrib. Bot. **1**: 133. 1861; Pilger in E. & P. Nat. Pfl. Nachtr. **2**: 108. 1906.

*Drimys Winteri* var. *semiglobosa* Dusén in Arch. Mus. Nac. Rio **13**: 62. 1905.

*Drimys brasiliensis* var. *montana* Hauman in Comun. Mus. Nac. Buenos Aires **2**: 50. 1923; Hauman & Irigoyen in An. Mus. Nac. Buenos Aires **32**: 227. 1923.

Shrub or tree, up to 13 m. high, the branchlets 2–5 mm. in diameter toward apices; leaves scattered or crowded along distal portions of branchlets, usually evenly distributed and not clustered in whorls; petioles 3–17(–30) mm. long, 1–2 mm. in diameter, somewhat swollen toward base; leaf-blades coriaceous or thin-coriaceous, pale brown to greenish and usually shining above when dried, narrowly elliptic-obovate or oblong or elliptic, (3–)4–11(–14) cm. long, (0.8–)1.2–4(–5) cm. broad, rounded or broadly obtuse or faintly emarginate at apex, narrowly recurved to conspicuously revolute at margin, often more obviously so toward base, the secondary nerves 6–10(–12) per side, erecto-patent at an angle of 40–50°, scarcely prominulous or immersed above, prominulous or immersed beneath, inconspicuously anastomosing toward margin, the veinlets immersed; inflorescences usually aggregated at apices of branchlets, rarely axillary, umbellate (flowers rarely single, occasionally fasciculate), the peduncle up to 40 mm. long, usually obviously flattened, the flowers (1–)2–6 per inflorescence, the pedicels 5–40 mm. long; sepals membranaceous or sub-membranaceous, obscurely opaque- or pellucid-glandular, suborbicular or deltoid-orbicular, 4–7 mm. long, 4–8 mm. broad; petals 8–14 (rarely to 20), opaque-yellow-glandular or very sparsely so, 7–17 mm. long, 2–5 mm. broad; stamens 20–40(–50), the filaments 0.5–2.5 mm. long, the connective yellow-glandular (usually conspicuously so at apex, sometimes scarcely so); carpels 3–8(–13), the stigma conspicuous, on a stipe usually 0.2–0.5 mm. long, the ovules 6–12. (FIG. 3, g–j.)

DISTRIBUTION: Southeastern Brazil (Bahia to Paraná [and Rio Grande do Sul, according to Eichler]), adjacent Paraguay, and Misiones in northern Argentina, at altitudes between 800 and 1250 m. (according to collectors' incomplete data, but probably found both lower and higher); occurring in forests, woods, or campos, often on shores of streams; said to be fairly common in parts of Minas Geraes.

BRAZIL: Bahia: Rio de Contas, Bom Jesus, *Lützelburg* 268 (NY); Minas Geraes: *St. Hilaire* (TYPE COLL. of *D. granadensis* var. *campestris*, NY), *St. Hilaire* (TYPE COLL. of *D. granadensis* var. *sylvatica*, NY), *Gardner* 4402 (M, NY, US), *Claussen* (F, NY), 1064 (GH); Rio Tejuco, *Ackermann* [*Mart. Herb. Fl. Bras.* 288] (GH, M, NY), *Vauthier* 489 (GH); Diamantina, Olaria, *Mexia* 5791 (A, GH, M, NY, UC, US); Jacuba, Serra dos Crystaes, Mun. Diamantina, *Mello Barreto* 10069 (F); Serra da Piedade, Mun. Caeté, *Mello Barreto* 7451 (F), *Warming* (NY); Serra de Cipó, Mun. Santa Luzia, *Mello Barreto* 7452 (F); Caldas, *Regnell* 145 (US), *Mosén* 331 (NY); Rio de Janeiro: Vargem, Organ Mts., *Miers* 4606 (US); São Paulo: *Lund* (NY); Serra de Cubatão, *Burchell* 3567 (GH, NY); Alto da Serra, *Hoehne* 1205 (A, US); Butantan, *Hoehne* 3839 (GH); Jardim Botânico, São Paulo, *Hoehne* 28700 (F, NY); Paraná: Pinhaes, *Dusén* 14504 (M); without definite locality: *Sellow* (M), *Burchell* 4748 (GH), *Riedel* (A), *Collector?* (M).

PARAGUAY: Sierra de Amambay, *Rojas* 9992 (A), 10586 (A).

ARGENTINE: Misiones: No specimens seen, but those cited by Hauman indicate the occurrence of the variety in Misiones.

NATIVE NAMES: *Casca d'Anta*, *cataia*, *curvillo* (in Brazil). St. Hilaire has discussed native uses of this plant, and his data are repeated by subsequent writers.

Collectors of the above-listed specimens note this plant as a shrub or tree, as low as 50 cm. high in open situations on campos and up to 13 m. high in the forests. Probably this difference in habit has been the principal reason why St. Hilaire and other writers have distinguished varieties within this entity, which, on the basis of the material I have seen, cannot satisfactorily be further divided.

The majority of the specimens which I refer to *D. brasiliensis* is characterized by having the lower surfaces of the leaf-blades distinctly papillate. Papillae are obviously present in the specimens of var. *retorta* and var. *roraimensis*, but they are lacking in the following specimens of var. *campestris*: *Lützelberg* 268, *Claussen* 1064, *Miers* 4606, *Burchell* 3567, *Hoehne* 1205 and 28700, and *Dusén* 14504. The remaining specimens of var. *campestris* have the lower leaf-surfaces clearly papillate. Whether the presence or absence of such papillae is a fundamental character cannot be stated at present, but quite possibly the population under discussion should be broken up into varieties on this basis. On the other hand, the papillate and the non-papillate specimens present no geographic pattern, nor is this character accompanied by any other. In leaf-size, number and size of floral parts, etc., there is considerable variation within var. *campestris*, but such variation in different organs is not correlated and therefore, in the present state of our knowledge, not usable for further subspecific division.

4b. *Drimys brasiliensis* var. **retorta** (Miers) comb. nov.

*Drimys retorta* Miers in Ann. Mag. Nat. Hist. III. **2**: 45. 1858, Contrib. Bot. **1**: 134. *pl.* 26B. 1861; Pilger in E. & P. Nat. Pfl. Nachtr. **2**: 108. 1906.

*Drimys Winteri* f. *revoluta* Eichl. in Mart. Fl. Bras. **13**(1): 136. *pl.* 31, *f.* 2. 1864.

*Drimys ledifolia* Eichl. in Mart. Fl. Bras. **13**(1): 136, as synonym. 1864.

Shrub to 3 m. high, the branchlets 1.5–4 mm. in diameter toward apices; leaves crowded on branchlets, especially distally; petioles 3–11 mm. long, 0.7–1.5 mm. in diameter; leaf-blades coriaceous, dark green above when dried, narrowly elliptic- or oblong-lanceolate, (2–)2.5–5.5 cm. long, (0.2–)0.3–1.5 cm. broad, usually conspicuously emarginate at apex, sometimes merely rounded, strongly revolute at margins (lower leaf-surface often completely obscured by revolute margins), the secondary nerves and veinlets completely immersed and obscure; inflorescences aggregated around growing points, appearing axillary, umbellate (or flowers sometimes single), the peduncle rugulose, inconspicuous, up to 15 mm. long or obsolete, the flowers (1–)2–6 per inflorescence, the pedicels slender, 15–33 mm. long; sepals papyraceous, opaque, obscurely glandular, suborbicular-ovate, 5–6 mm. long, 4–7 mm. broad; petals 8–11, conspicuously opaque-yellow-glandular, 6–12 mm. long, 2–5 mm. broad; torus cylindrical, conspicuous; stamens 30–40, the filaments 1.5–2.5 mm. long, eglandular, the connective copiously and minutely yellow-glandular at apex; carpels 3–7, the stigma short-stipitate (stipe 0.3–0.7 mm. long), the ovules 6 or 7.

DISTRIBUTION: Minas Geraes, Brazil; probably restricted in area. Miers also cites a collection by Bowie from São Paulo. Eichler cites *Claussen* 340 and *Sellow*, both from Minas Geraes.

BRAZIL: Minas Geraes: *Claussen* s. n. or 1503 (COTYPE COLL., F); Serra do

Itacolomy, Mun. Ouro Preto, *Mello Barreto 9083* (F) (shrub 3 m. high, common; flowers white).

A few of the specimens referred to the typical variety of *D. brasiliensis* (var. *campestris*) have unusually small and strongly revolute leaf-blades, thus indicating a transition between that variety and var. *retorta*. The existence of such specimens (e. g. *Mello Barreto 7452, 10069, Mexia 5791*) indicates that *D. retorta* can be accepted as no more than a variety, and probably not a very stable one.

4c. ***Drimys brasiliensis* var. *angustifolia*** (Miers) comb. nov.

*Drimys angustifolia* Miers in Ann. Mag. Nat. Hist. III. **2**: 46. 1858, Contrib. Bot. **1**: 135. pl. 26A. 1861; Pilger in E. & P. Nat. Pfl. Nachtr. **2**: 108. 1906.

*Drimys Winteri* f. *angustifolia* Eichl. in Mart. Fl. Bras. **13**(1): 136. pl. 31, f. 3. 1864.

Branchlets slender; leaves scattered along branchlets distally; petioles slender, narrowly winged, 8–10 mm. long; leaf-blades elongate- or linear-lanceolate, 4–10 cm. long, 0.5–0.6 cm. broad, obtuse or faintly emarginate at apex, slightly recurved at margin but essentially plane, the secondary nerves entirely immersed and obscure; inflorescences aggregated at apices of branchlets, the flowers single or rarely paired on short inconspicuous peduncles, the pedicels about 12 mm. long; sepals ovate; petals 9 or 10; stamens about 18; carpels about 5.

DISTRIBUTION: Known only from a single unnumbered collection of Sellow from southeastern Brazil, without detailed locality, cited by Miers and Eichler.

I have seen no material of this plant, the above notes being taken from the descriptions and illustrations of Miers and Eichler. It appears to be sufficiently distinct to be recognized as a variety of *D. brasiliensis*. Both Miers and Eichler discuss it as an even more extreme form than *D. retorta*.

4d. ***Drimys brasiliensis* var. *roraimensis*** var. nov.

*Drimys granadensis* sensu Oliver in Trans. Linn. Soc. II. Bot. **2**: 271. 1886; N. E. Br. in Trans. Linn. Soc. II. Bot. **6**: 8. 1901; non L. f.

*Drimys Winteri* sensu Ule in Bot. Jahrb. **52**: Beibl. 115: 49. 1914; Knuth in Rep. Sp. Nov. Beih. **43**: 331. 1927; non J. R. & G. Forst.

Arbor parva (?), ramulis apicem versus 2–4 mm. diametro; foliis apicem ramulorum versus confertis; petiolis 5–15 mm. longis, 0.7–2 mm. diametro; laminis subcoriaceis, supra in sicco fuscis vel fusco-viridibus, oblongo-ellipticis, 6–11 cm. longis, 2.5–5 cm. latis, apice obtusis vel rotundatis, margine obscure recurvatis, nervis secundariis utrinsecus 7–14 angulo 55–70° patentibus utrinque prominulis vel subplanis, venulis immer-sis vel utrinque leviter prominulis; inflorescentiis ut videtur axillaribus et solitariis, floribus singularibus vel pedunculo gracili circiter 35 mm. longo binis, pedicellis gracilibus 50–80 mm. longis; sepalis papyraceis ovato-deltaideis circiter 5 mm. longis et 6 mm. latis; petalis 10–12 obscure glandulosis, 10–16 mm. longis, 3–6 mm. latis; staminibus 35–50, filamentis sparse luteo-glandulosis 1.5–2 mm. longis, connectivo dense glanduloso in apiculum circiter 0.15 mm. longum dense et minute luteo-glandulosum producto; carpellis circiter 9, stigmatibus sessilibus subterminalibus, ovulis 10–12. (FIG. 3, k–m.)

DISTRIBUTION: Known only from Mt. Roraima, on the Venezuela-Brazil-British Guiana boundary.

VENEZUELA (or adjacent countries): A m a z o n a s : Mt. Roraima, The Ledge, *im*



*Thurn 242* (US, TYPE), 1884; Rondon Camp, upper slopes, alt. about 2100 m., *Tate 500* (NY) (in humid temperate forest).

The variety described above is quite distinct from other American material of *Drimys*, being characterized by the apiculate and very densely glandular connective of the stamens. The long pedicels are also noteworthy, as is the fact that the stigma is essentially sessile, whereas in other specimens from the northern part of the range of the genus the stigma is short-stipitate. As my description is based upon only two specimens (of which the Tate collection is sterile), the rigidity of these characters remains to be seen. The relationship of this Roraima plant seems to be with the Brazilian rather than the Andean-Mexican species, as evidenced by the papillate lower leaf-surface and the rounded or broadly obtuse leaf-apex. It seems conceivable that this Roraima form may prove to merit specific status when more ample material is available.

#### EXCLUDED SPECIES

*DRIMYS VASCULARIS* Parment. in Bull. Sci. Fr. & Belg. **27**: 229, 306. *pl. 11, f. 39, 40*. 1896.

In a footnote on page 229 of the above-cited publication, Parmentier states: "Etiquette: 'Drimys. — Brésil; Martins; cortex aromaticus.' (Unicum)." The description is detailed as far as anatomical details are concerned, but the habit-sketch (*f. 39*) cannot possibly be taken to represent a species of *Drimys*. On p. 229 we read: "N'ayant eu à ma disposition que des fleurs mal conservées, très petites, il m'a été impossible d'en reconnaître tous les caractères; j'ai néanmoins pu m'assurer que ce sont bien des fleurs de *Drimys*, surtout à cause de la forme de leur calice." In view of this uncertainty, Parmentier would have been wiser not to have proposed the species at all; in fact, had Parmentier's work in its entirety never been published, taxonomy would have benefited from the omission. Van Tieghem's remarks (**11**: 284, 285) in this connection are of interest.

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